

## UNIFORM NETWORK CODE – TRANSPORTATION PRINCIPAL DOCUMENT

### SECTION H – DEMAND ESTIMATION AND DEMAND FORECASTING

#### 1 DEMAND MODELS AND END USER CATEGORIES

##### 1.1 Introduction

1.1.1 Demand for gas at NDM Supply Point Components is required to be estimated (in accordance with this Section H) for purposes including determining Supply Point Capacity and NTS Exit Capacity under Section B, establishing nominations under Section C and daily offtakes under Section E, and determining Annual Quantities under Section G1.6.<sup>1</sup>

1.1.2 For the purposes of such demand estimation, each NDM Supply Point Component will belong to an End User Category for which a Demand Model will be established in accordance with this paragraph 1.

1.1.3 In accordance with GT Section C2.6, references in this Section H to demand are:

- (a) at the level of any System Exit Point or End User Category, exclusive of shrinkage;
- (b) at the level of an LDZ, inclusive of LDZ shrinkage;
- (c) at the level of LDZ Aggregate NDM Points, exclusive of shrinkage.

1.1.4 In its application in respect of NDM Supply Point Components whose Annual Quantities exceed 2,196,000 kWh (75,000 therms), certain provisions of this Section H are modified as herein provided.

1.1.5 For the purposes of the Code "**LDZ Aggregate NDM Points**" are in relation to an LDZ all the NDM Supply Point Components and all relevant Connected System Exit Points in the LDZ.

##### 1.2 End User Categories

1.2.1 An "**End User Category**" is a category of NDM Supply Point Components in an LDZ defined by rules established in accordance with paragraph 1.6.9; and where appropriate a reference to an End User Category includes reference to the NDM Supply Point Components for the time being belonging to that category.

1.2.2 End User Categories will be defined:

- (a) by reference only to variables values of which:
  - (i) are maintained in the Supply Point Register; and/or
  - (ii) can be derived from Meter Readings obtained with the Meter Reading Frequency required (in relation to relevant Supply Meters) under

<sup>1</sup> Implementation of modification 0195AV, effective 06:00hrs on 01 April 2009, will amend paragraph 1.1.1.

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in respect of NDM Supply Point Components belonging to the relevant category; and

- (b) so that at any time every NDM Supply Point Component belongs to one and only one such category.

1.2.3 The "**Applicable End User Category**" in respect of an NDM Supply Point Component or NDM Supply Meter Point at any time is the End User Category to which the NDM Supply Point Component (or that in which that Supply Meter Point is comprised) belongs at that time.

1.2.4 The "**EUC Sample**" in relation to an End User Category is the Sampled NDM Supply Point Components (in accordance with paragraph 1.6.4) belonging to that category.

### 1.3 Demand Models

1.3.1 For the purposes of this Section H a "**Demand Model**" is a mathematical model which estimates, for an LDZ, an End User Category or LDZ Aggregate NDM Points, by reference to variables (including weather and day of week) specified by the Transporters for the purposes of the model, daily demand at the System Exit Points in the LDZ or (as the case may be) the EUC Sample or (as the case may be) LDZ Aggregate NDM Points.

1.3.2 The "**Applicable Demand Model**" in relation to an LDZ, an End User Category or LDZ Aggregate NDM Points is the Demand Model applicable in any Gas Year to such LDZ or End User Category or LDZ Aggregate NDM Points in accordance with this paragraph 1.

1.3.3 Notwithstanding GT Section C3.3.1, a Demand Model may estimate demand (for all relevant System Exit Points) on the basis of the flow weighted average calorific value referred to in GT Section C3.3.1(c)(iii).

### 1.4 Composite Weather Variable

1.4.1 The elements of a Demand Model will include:

- (a) a single variable (the "**Composite Weather Variable**") derived from a formula established by the Transporters and estimated to represent for the relevant LDZ the combined effect on demand of the components of weather (including actual temperature, seasonal normal temperature and windchill, with relative weights assigned to each) which affect demand; and
- (b) a single coefficient ("**Weather Variable Coefficient**") in respect of the element of demand (in the relevant LDZ or End User Category) which varies with weather as represented by the Composite Weather Variable.

1.4.2 Every 5 years, commencing 2000, the Transporters will, after consultation with the Uniform Network Code Committee or any relevant Sub-committee, review and where appropriate revise (with effect from the start of a Gas Year) the formula by which the Composite Weather Variable for an LDZ is determined on the basis of new weather experience; provided that the Transporters may (after such consultation) revise such formula at more frequent intervals where the Transporters determine it to be appropriate

on the basis of unusual new weather experience in any shorter period.

- 1.4.3 Daily values of the Composite Weather Variable for an LDZ, required for the purposes of developing Demand Models, will be established (by reference to the prevailing formula) on the basis of weather data relating to the relevant LDZ obtained by the Transporter in accordance with paragraph 5.2.

## 1.5 Seasonal Normal Demand

- 1.5.1 For the purposes of this Section H seasonal normal demand ("**SND**") for an LDZ, an EUC Sample or LDZ Aggregate NDM Points for any Day will be determined in accordance with the Applicable Demand Model on the basis of the seasonal normal value of the Composite Weather Variable for the Day in respect of that LDZ.
- 1.5.2 The "**seasonal normal value**" of the Composite Weather Variable for an LDZ for a Day in any year is the smoothed average of the values of the variable (derived from the formula prevailing in accordance with paragraph 1.4 for that year) for that Day:
  - (a) in a significant number of consecutive previous years, up to and including a year not more than 6 years prior to the year in question, derived from weather records maintained by the Transporters, and
  - (b) where the Transporters so determine, in the current year and one or more subsequent years, derived from forecasts by the Meteorological Office or other reputable meteorological services provider.
- 1.5.3 Where the seasonal normal values of the Composite Weather Variable are revised, the Transporters will provide to Users the revised values not later than 30th June in the Gas Year before the Gas Year in which such values first apply.

## 1.6 NDM Sampling

- 1.6.1 For the purposes of development of End User Categories and Demand Models the Transporter (other than National Grid NTS) will obtain data (which may, subject to paragraph 1.6.7, include estimates of missing data) as to daily offtakes of gas at the Supply Meter Points comprised in a sample of NDM Supply Point Components in each relevant LDZ.
- 1.6.2 For the purposes of paragraph 1.6.1:
  - (a) the Transporter shall be entitled at its cost to install, operate and read data recorders at NDM Supply Meter Points from time to time selected by the Transporter;
  - (b) the Transporter will designate (as sampled for such purposes) NDM Supply Meter Points at which Daily Read Equipment is installed or at which it wishes to install Daily Read Equipment and which are comprised in Supply Points whose Annual Quantities are not greater than 2,196,000 kWh (75,000 therms);
  - (c) the sample will be selected by the Transporter by random sampling from NDM Supply Point Components having different Annual Quantities and geographical locations.

- 1.6.3 For the purposes of paragraph 1.6.2:
- (a) a data recorder is a device which captures Meter Readings at the start of each Day, but is capable of being read only at the Supply Point Premises;
  - (b) the Transporter will not select any NDM Supply Meter Point for installing a data recorder or Daily Read Equipment without the consent of the consumer.
- 1.6.4 For each Gas Year an NDM Supply Point Component at which a data recorder is for the time being installed or which is for the time being designated under paragraph 1.6.2(b) is a "**Sampled**" NDM Supply Point Component.
- 1.6.5 The aggregate number of Sampled NDM Supply Point Components:
- (a) for all LDZs will be approximately 3,900 (of which approximately 2,700 will be subject to paragraph 1.6.2(a) and 1,200 subject to paragraph 1.6.2(b));
  - (b) for a particular LDZ will be:
    - (i) the approximate number of Sampled NDM Supply Point Components specified by the Transporters in a document published by the Transporters for the purposes of this paragraph 1.6; and
    - (ii) comprised of NDM Supply Point Components located at points on the LDZ of a similar geographical location within the area in which the LDZ is located as was the case at 1 March 1996
- or such other number as may be established pursuant to paragraph 1.6.6.
- 1.6.6 The Transporters will consult from time to time with all Users and the Authority on whether to increase or reduce the number or materially alter the identity or location of the NDM Supply Point Components for all LDZs or a particular LDZ which are Sampled.
- 1.6.7 The data obtained by the Transporter in accordance with paragraph 1.6.1 will be subject to validation by the Transporter (by techniques which provide reasonable statistical assurance of the validity of each data set), and such of the data as is so validated will be the demand data in respect of Sampled NDM Supply Point Components for the purposes of paragraph 1.7.2.
- 1.6.8 For NDM Supply Point Components whose Annual Quantity exceeds 2,196,000 kWh (75,000 therms) paragraphs 1.6.1 and 1.6.7 will not apply and the data used for the development of Demand Models will be data (including estimates of missing data) obtained for each Gas Year from Supply Meter Points comprised in Supply Point Components from a sample randomly selected by the Transporter having different Annual Quantities in the relevant LDZ; the aggregate number of such Supply Point Components for all such LDZs will be approximately 1,600 and reference to the EUC Sample shall be construed accordingly.
- 1.6.9 The Registered User will co-operate with the Transporter:
- (a) in enabling access (where required) to Supply Meters for the purposes of establishing the NDM samples of NDM Supply Point Components and in ensuring that such samples are and will continue to fulfil the requirement to

obtain the data as described in paragraphs 1.6.1 and 1.6.8;

- (b) in obtaining the consent (where required) of any relevant person including the consumer for the installation, operation and reading of the data recorder or Daily Read Equipment at NDM Supply Meter Point.

## **1.7 Development of Demand Models and End User Categories**

1.7.1 For each Gas Year, after 31 March in the Preceding Year, the Transporters will:

- (a) update the recorded data (maintained for the purposes of this paragraph from October 1994) by the relevant data in accordance with paragraph 1.7.2;
- (b) select a set of such data with a view to achieving an appropriate balance between the objectives (so far as conflicting) of maximising the size of EUC Samples and the period to which such set of data relates;
- (c) by statistical analysis (applied consistently as between End User Categories) of the selected data, develop or revise for each LDZ:
  - (i) definitions of a number of End User Categories for the LDZ;
  - (ii) a Demand Model for each such End User Category;
  - (iii) a Demand Model for the LDZ; and
  - (iv) a Demand Model for LDZ Aggregate NDM Points

which (on the basis of such data and analysis) in the Transporters' reasonable judgment are most appropriate having regard to the objectives in paragraph 1.7.3.

1.7.2 The relevant data is:

- (a) the demand data for each Sampled NDM Supply Point Component referred to in paragraph 1.6;
- (b) the demand data for LDZ Aggregate NDM Points (such demand data being the LDZ Daily Quantity Offtaken less the aggregate sum for quantities offtaken at all DM Supply Point Components and relevant Connected System Exit Points in the LDZ and adjusted by deducting LDZ shrinkage); and
- (c) demand data and daily values of the Composite Weather Variable for each LDZ, for a 12 month period ending in March in the Preceding Year

and in respect of a Transporter relevant data is data in relation to a relevant System.

1.7.3 The objectives referred to in paragraph 1.7.1(c) are:

- (a) to define End User Categories so as to recognise significant differences in the annual profile of daily demand at different groups of NDM Supply Point Components; and
- (b) to maximise the goodness of fit (in statistical terms) of the Demand Model

applicable to each End User Category to the relevant updated data referred to in paragraph 1.7.1(a).

- 1.7.4 The definition of an End User Category may be the same for all or several LDZs, and an EUC Sample may include the Supply Point Components in more than one LDZ.
- 1.7.5 For NDM Supply Point Components whose Annual Quantities exceed 2,196,000 kWh (75,000 therms) the End User Categories (insofar as defined by reference to Annual Quantities) will be those applicable for the Gas Year commencing 1 October 1995 and will not be revised annually; and to that extent paragraphs 1.7.1(c)(i) and 1.7.3(a) shall not apply in respect thereof.

## **1.8 Consultation on the Transporters' proposals**

- 1.8.1 The Transporters will, in June of the Preceding Year, consult with the Uniform Network Code Committee or any relevant Sub-committee on proposed End User Category definitions and Demand Models developed under paragraph 1.6.9, and not later than 30 June in the Preceding Year will submit to all Users:
  - (a) the proposed End User Category definitions and Demand Models developed under paragraph 1.6.9;
  - (b) values of the Derived Factors (in accordance with paragraph 1.9.3), determined on the basis of such proposals;
  - (c) any alternative End User Category definitions and Demand Models which the Transporters (in undertaking the exercise under paragraph 1.6.9) considered to be not significantly inferior (on the basis of the objectives in paragraph 1.7.3 and such other criteria as the Transporters may reasonably consider to be appropriate) to those proposed; and
  - (d) a summary of the Transporters' analysis of the performance in the Preceding Year against the objectives in paragraph 1.7.3 of the End User Categories and Demand Models (applicable in the Preceding Year).
- 1.8.2 Upon the request (made not earlier than 1 May nor later than 31 May in the Preceding Year) of any User, the Transporters will not later than 15 June in the Preceding Year provide to that User (by electronic format chosen by the Transporters) the data referred to in paragraph 1.7.2 (aggregated by EUC Sample in the case of the data referred to in paragraph 1.6.8), together with other data used in the analysis referred to in paragraph 1.8.1(d), in a form which does not include the identity of Registered Users, Supply Point Premises, suppliers or consumers, nor details of the individual components of the Composite Weather Variable.
- 1.8.3 Users may submit to a Transporter representations in respect of the proposed End User Categories and Demand Models up to but not later than 15 July in the Preceding Year.
- 1.8.4 Between 16 July and 14 August in the Preceding Year, the Transporters:
  - (a) will review the representations made by Users under paragraph 1.8.3;
  - (b) will consult, so far as they deem appropriate, with any User in respect of representations made by them or any other User;

- (c) may convene meetings with any User or Users for the purposes of such consultation.

- 1.8.5 The Transporters will make available to Users reasonable details of the representations made to them under paragraph 1.8.3 and consultations held under paragraph 1.8.4 (but may do so by oral presentation at a meeting of Users convened under paragraph 1.8.4(c)); and shall be free to disclose to any User and the Authority any such representation and details of any such consultation.
- 1.8.6 The Transporters may at any time convene a meeting of the Uniform Network Code Committee or any relevant Sub-committee for the purposes of consulting on any particular issue which may arise in the development or revision under paragraph 1.7.1 of End User Categories and Demand Models.

## **1.9 Finalisation of End User Categories and Demand Models**

- 1.9.1 Not later than 15 August in the Preceding Year, the Transporters will submit to the Authority and all Users their final proposals for End User Categories and Demand Models (and corresponding values of the Derived Factors) with such changes as the Transporters may on the basis of Users' representations and consultation under paragraph 1.8 determine appropriate.
- 1.9.2 The End User Categories and Demand Models (and corresponding values of the Derived Factors) applicable to the Gas Year shall be those submitted by the Transporters under paragraph 1.9.1 unless upon the application of the Transporters or any User, made not later than the 5th Business Day after the final proposals were submitted, the Authority shall within a further five Business Days after such date give Condition A11(18) Disapproval to the Transporters applying any particular such End User Category or Demand Model (and corresponding values), in which case the Transporters will use the End User Categories and End User Category Demand Models applying in the Preceding Year to create corresponding values of the Derived Factors and such End User Categories and Derived Factors shall then apply to the Gas Year.
- 1.9.3 For the purposes of this Section H the "**Derived Factors**" are:
  - (a) for each Day of the Gas Year, the Annual Load Profile and Daily Adjustment Factor (in accordance with paragraph 2) for each End User Category; and
  - (b) the EUC peak load factor for each End User Category and the peak load scaling factor (in accordance with paragraph 4).

## **1.10 DNO Users**

In this Section H references to Users exclude DNO Users.

# **2 DETERMINATION OF SUPPLY METER POINT DEMAND**

## **2.1 Supply Meter Point Demand**

- 2.1.1 For the purposes of this Section H "**NDM Supply Meter Point Demand**" is the quantity of gas estimated or (as the case may be) deemed to be offtaken on a Day at an NDM Supply Meter Point.

- 2.1.2 Subject to paragraph 2.1.3 NDM Supply Meter Point Demand will be determined (in accordance with paragraph 2.2):
- (a) before and (as appropriate) during the Gas Flow Day, for the purpose ("**Nomination Determination**") of establishing Output Nominations for NDM Supply Point Groups, in accordance with Section C;
  - (b) after the Gas Flow Day, for the purpose ("**Offtake Determination**") of establishing UDQOs for NDM Supply Point Components, in accordance with Section E.
- 2.1.3 For the purpose only of establishing an assumed metered volume to carry out individual NDM Reconciliation pursuant to Section E6.1.6, NDM Supply Meter Point Demand will be determined in accordance with paragraph 2.2.2.

## 2.2 Supply Meter Point Demand Formula

- 2.2.1 NDM Supply Meter Point Demand ('SPD') for a Day (Day 't') shall be determined according to the following formula:

$$SPD = \frac{AQ}{365} \times ALP_t \times (1 + DAF_t \times WCF_t) \times SF_t$$

where AQ is the Annual Quantity (in kWh) in respect of the relevant NDM Supply Meter Point (in accordance with paragraph 3.1.5(a) in the case of a Shared Supply Meter Point);

and where for Day 't':

- ALP<sub>t</sub> is the value of the Annual Load Profile for the Applicable End User Category;
- DAF<sub>t</sub> is the value of the Daily Adjustment Factor for the Applicable End User Category;
- WCF<sub>t</sub> is the Weather Correction Factor for the relevant LDZ in accordance with paragraph 2.5;
- SF<sub>t</sub> is the Scaling Factor for the relevant LDZ in accordance with paragraph 2.5.

- 2.2.2 For the purposes of paragraph 2.1.3 NDM Supply Meter Point Demand ('SPD') for a Day (Day 't') shall be determined according to the following formula:

$$SPD = \frac{AQ}{365} \times ALP_t$$

Where AQ is the Annual Quantity (in kWh) in respect of the relevant NDM Supply Meter Point (in accordance with Paragraph 3.1.5(a) in the case of a Shared Supply Meter Point);



and where for Day 't'

ALP<sub>t</sub> is the value of the Annual Load Profile for the Applicable End User Category.

### 2.3 Annual Load Profile

2.3.1 The "**Annual Load Profile**" for an End User Category for a Day is a factor representing the Seasonal Normal Demand of the End User Category for that Day as a proportion of the average Seasonal Normal Demand (for all Days of the Gas Year) of the End User Category.

2.3.2 The Annual Load Profile ('ALP<sub>t</sub>') for an End User Category for Day t shall be determined as:

$$ALP_t = \frac{SNDE_t}{\left( \frac{\sum_{t=1}^N SNDE_t}{N} \right)}$$

where:

SNDE<sub>t</sub> is seasonal normal demand for the End User Category for Day t

N is the number of Days in the Gas Year.

### 2.4 Daily Adjustment Factor

2.4.1 The "**Daily Adjustment Factor**" for an End User Category for a Day is a factor representing the weather sensitivity of demand in that End User Category on that Day relative to the weather sensitivity of demand in the LDZ on that Day.

2.4.2 The Daily Adjustment Factor ('DAF<sub>t</sub>') for an End User Category for a Day shall be determined as:

$$DAF_t = \frac{(WVCE_t / SNDE_t)}{(WVCN_t / SNDN_t)}$$

where for Day t:

WVCN<sub>t</sub> is the value of the Weather Variable Coefficient (in accordance with paragraph 1.4) in the Demand Model for the LDZ Aggregate NDM Points for the relevant LDZ;

SNDN<sub>t</sub> is the value of seasonal normal demand for LDZ Aggregate NDM Points for the relevant LDZ;

WVCE<sub>t</sub> is the value of the Weather Variable Coefficient in the Demand Model for the End User Category;

SNDE<sub>t</sub> is the value of seasonal normal demand for the End User Category.

## 2.5 Weather Correction Factor and Scaling Factor

- 2.5.1 For the purposes of paragraph 2.2 the "**Weather Correction Factor**" ('WCF<sub>t</sub>') and "**Scaling Factor**" ('SF<sub>t</sub>') in respect of an LDZ are (respectively) the factors determined as follows:

$$SF_t = ASD_t / NDMD_t$$

$$WCF_t = (ASD_t - \sum((AQ_{EUC}/365) * ALP_{iLDZ}) / \sum((AQ_{EUC}/365) * ALP_{iLDZ})$$

ASD<sub>t</sub> is:

- (a) for the purposes of Nomination Determination, Forecast LDZ Demand (at the relevant time of Nomination Determination) determined in accordance with paragraph 5.2 less the aggregate sum of DM Output Nominations (at the relevant time of Nomination Determination) at all DM Supply Point Components and relevant Connected System Exit Points in the LDZ and adjusted by deducting LDZ shrinkage;
- (b) for the purposes of Offtake Determination, that quantity comprised in the LDZ Daily Quantity Offtaken attributable to NDM Supply Point Components and relevant Connected System Exit Points (determined as the LDZ Daily Quantity Offtaken less the aggregate sum for quantities offtaken at all DM Supply Point Components and relevant Connected System Exit Points in the LDZ and adjusted by deducting LDZ shrinkage);

SNND<sub>t</sub> has the meaning in paragraph 2.4.2; and

NDMD<sub>t</sub> is the aggregate for all NDM Supply Point Components and for any relevant Connected System Exit Point in the LDZ of the amounts determined by calculating Supply Point Demand for Day t in accordance with paragraph 2.2 with a Scaling Factor equal to one or (as the case may be) calculated in accordance with the relevant provisions of the CSEP Network Exit Provisions.

AQ<sub>EUC</sub> is the aggregate Annual Quantity for the Applicable End User Category as at 1<sup>st</sup> October, or as revised from time to time pursuant to paragraph 2.5.3.

- 2.5.2 In respect of each Gas Year, the Transporters will, on a specific date (the "**designated date**"), within:
- (a) the period of 3 calendar months ending on 31 December compare the aggregate NDM Annual Quantity for each LDZ ("**aggregate NDM LDZ AQ**") with the aggregate NDM LDZ AQ as at 1 October; and
  - (b) the period of 3 calendar months ending on 31 March and 30 June compare the aggregate NDM LDZ AQ with the aggregate NDM LDZ AQ as at:
    - (i) the previous designated date at which the comparison resulted in a revision being made pursuant to paragraph 2.5.3(b); or
    - (ii) where the comparison at the previous designated date does not result in a revision being made pursuant to paragraph 2.5.3(b), 1 October.

2.5.3 Where the comparison made in accordance with paragraph 2.5.2 determines that the aggregate NDM LDZ AQ has increased or decreased by an amount of more than 1%, the Transporters will:

- (a) on the first day of the month following the period in which such comparison was performed, publish the revised values that will apply in respect of  $\sum ((AQ_{EUC}/365) * ALP_t)$  for each LDZ;
- (b) apply such revised values from the date referred to in paragraph (a).

### 3 NDM ANNUAL QUANTITIES

#### 3.1 Introduction

3.1.1 Subject to paragraphs 3.1.2 and 3.1.3, the Annual Quantity or the Provisional Annual Quantity of an NDM Supply Meter Point for each Gas Year shall be determined (on the basis of a standard 365 Day year) by seasonal normal adjustment of the metered quantity for a period ending before such Gas Year in accordance with this paragraph 3.

3.1.2 Subject to paragraph 3.4.4, in the circumstances in paragraph 3.2.4 the Annual Quantity or the Provisional Annual Quantity of the NDM Supply Meter Point for a Gas Year shall be that applicable for the Preceding Year.

3.1.3 For the Gas Year in which a New Supply Meter Point is established its Provisional Annual Quantity shall be the quantity specified by the relevant User in accordance with Section G7.3.6.

3.1.4 Upon annual determination thereof in accordance with this paragraph 3, the Annual Quantity of an NDM Supply Meter Point will be notified to the Registered User in accordance with Section G1.6.12.

3.1.5 In the case of a Shared Supply Meter Point which is an NDM Supply Meter Point:

- (a) the Annual Quantity shall be established for the Supply Meter Point as a whole (disregarding the Shared Supply Meter Notification);
- (b) thereafter a separate Annual Quantity shall be established (in accordance with Section G1.7.11) in respect of each Sharing Registered User.

#### 3.2 Relevant Metered Period

3.2.1 For the purposes of this paragraph 3.2 the "**Relevant Metered Period**" in respect of a Gas Year is the period from the Day after the starting Meter Read (in accordance with paragraph 3.2.3) to the ending Meter Read (in accordance with paragraph 3.2.2).

3.2.2 The ending Meter Read is the latest Valid Meter Read (in accordance with Section M3) before 10 August in the Preceding Year.

3.2.3 The starting Meter Read shall be:

- (a) the latest Valid Meter Read before the target opening date, or if there was no such Meter Read less than three years before the target opening date;

- (b) subject to paragraph 3.2.4, the first Valid Meter Read after the target opening date.

Provided always that the starting Meter Read shall be no earlier than 1 October 2002.

- 3.2.4 If there was no Valid Meter Read less than three years before the target opening date or more than 6 months before the ending Meter Read, or the first Valid Meter Read after the target opening date was earlier than 1 October 2002, paragraph 3.1.2 shall apply.
- 3.2.5 For the purposes of this paragraph 3.2 the "**target opening date**" is the date which is:
- (a) where the NDM Supply Point Meter is a Monthly Read Meter, 50 weeks; or
- (b) where the NDM Supply Point Meter is an Annual Read Meter, 42 weeks before the ending Meter Read.

### 3.3 Relevant Metered Quantity

The "**Relevant Metered Quantity**" is the Metered Quantity or (if there was one or more intervening Valid Meter Reads in the Relevant Metered Period) the sum of the Metered Quantities for the Relevant Metered Period (in accordance with Section M1.4.4(b)).

### 3.4 Annual Quantity

- 3.4.1 Subject to paragraph 3.4.3, the Annual Quantity ('AQ') for an NDM Supply Meter Point for a Gas Year shall be determined as follows:

$$AQ = RMQ \times \frac{365}{\sum_{t=1}^M (ALP_t \times (1 + DAF_t \times EWCF_t))}$$

where:

RMQ is the Relevant Metered Quantity;

M is the number of Days in the Relevant Metered Period;

and where for each Day (Day 't') in the Relevant Metered Period:

ALP<sub>t</sub> is the value for the year in which Day t falls (the "**relevant year**") of the Annual Load Profile for the Applicable End User Category;

DAF<sub>t</sub> is the value for the relevant year of the Daily Adjustment Factor for the Applicable End User Category;

EWCF<sub>t</sub> is the value for the relevant year of the Estimated Weather Correction Factor (in accordance with paragraph 3.4.2).

- 3.4.2 The "**Estimated Weather Correction Factor**" for a Day in respect of an LDZ is the factor determined by calculating the Weather Correction Factor (in accordance with paragraph 2.5) for that Day substituting for the term 'ASD<sub>t</sub>' the value of demand for the

LDZ Aggregate NDM Points determined from the Applicable Demand Model for the relevant year (on the basis of the value of the Composite Weather Variable).

- 3.4.3 Where a review has taken place pursuant to paragraphs 1.4.2 and 1.5.2 (for the purposes of this paragraph 3.4.3 and paragraph 3.4.4, the “**Review**”) the Annual Quantity for an NDM Supply Meter Point applicable from the start of the Gas Year in which the Review took effect will use revised Applicable Demand Models derived from the data used to calculate the Applicable Demand Models for the Gas Year immediately prior to the Gas Year that the Review took effect, together with the revised Composite Weather Variables and seasonal normal values, to calculate the values of ALPt, DAFt and EWCft.
- 3.4.4 Notwithstanding paragraph 3.1.2, where a Review has taken place and the provisions of paragraph 3.4.3 apply, the Annual Quantity or the Provisional Annual Quantity of the NDM Supply Meter Point will be calculated as follows:

$$AQ = AQ_1 \times \frac{A}{B}$$

Where:

AQ1 = the Annual Quantity or the Provisional Annual Quantity of the NDM Supply Point applicable for the Preceding Year.

$$A = \sum_{i=1}^{365} SNDE_i$$

Where the values of SNDE<sub>i</sub> shall be derived using revised Applicable Demand Models derived from the data used to calculate the Applicable Demand Models for the Gas Year immediately prior to the Gas Year that the Review took effect, together with the revised Composite Weather Variables and seasonal normal values

$$B = \sum_{i=1}^{365} SNDE_i$$

Where the values of SNDE<sub>i</sub> shall be derived using the Applicable Demand Models for the Gas Year immediately prior to the Gas Year that the Review took effect.

## 4 NDM CAPACITY

### 4.1 Introduction<sup>2</sup>

The Supply Point Capacity ('SPC') and the NTS Exit Capacity ('NEC') which a User is registered as holding at or (as the case may be) in respect of an NDM Supply Point Component on any Day in the Gas Year will be determined in accordance with the following formula:

$$SPC = NEC = \frac{AQ}{PLF \times 365}$$

<sup>2</sup> Implementation of modification 0195AV, effective 06:00hrs on 01 April 2009, will amend paragraph 4.1.

where:

AQ is the Annual Quantity of the NDM Supply Point Component for the Gas Year;

PLF is the EUC peak load factor in accordance with paragraph 4.2.

#### 4.2 EUC peak load factor

The "**EUC peak load factor**" is a load factor for the Applicable End User Category determined as follows:

$$PLF = \frac{AAQ}{PDD - 365}$$

where:

AAQ is the sum of the Annual Quantities in respect of the NDM Supply Point Components in the EUC Sample; and

PDD is the 1-in-20 peak day demand of the Applicable End User Category determined under paragraph 4.3.

#### 4.3 1-in-20 peak day demand

4.3.1 The Transporter will determine 1-in-20 peak day demand by simulation using the relevant Demand Model and otherwise in accordance with the methodology referred to in GT Section C2.6.6.

4.3.2 For NDM Supply Point Components whose Annual Quantities exceed 2,196,000 kWh (75,000 therms) 1-in-20 peak day demand will be determined as aggregate NDM Supply Meter Point Demand (for all Supply Meter Points comprised in the NDM Supply Point Component) in accordance with paragraph 2 on the basis that:

- (a) for the purposes of determining the values of 'ALP<sub>t</sub>', 'DAF<sub>t</sub>' and 'SNDN<sub>t</sub>', Day 't' is the Day of the highest seasonal normal demand under the Applicable Demand Model for the relevant LDZ Aggregate NDM Points;
- (b) for the purpose of determining the value of 'WCF<sub>t</sub>' under paragraph 2.5, the value of 'ASD<sub>t</sub>' is 1-in-20 peak day demand for the relevant LDZ Aggregate NDM Points; and
- (c) the value of 'SF<sub>t</sub>' is 1.

### 5 DAILY DEMAND FORECASTING

#### 5.1 Weather forecasting

5.1.1 National Grid NTS will obtain (from the Meteorological Office or other reputable meteorological services provider) at certain times within each Day:

- (a) forecasts of temperatures and wind speeds at a number of weather stations at intervals during the remainder of that Day and the following Day;
- (b) details of the temperatures and wind speeds recorded at such weather stations at

intervals during that Day and the preceding Day.

- 5.1.2 The times at which National Grid NTS will obtain weather data under paragraph 5.1.1 include the following approximate times: 11:30 hours, 15:15 hours and 23:30 hours on the Preceding Day and 07:30 hours, 11:30 hours and 15:15 hours on the Gas Flow Day.

## 5.2 LDZ Demand Forecasting

- 5.2.1 The Transporter will (during the Preceding Day and the Gas Flow Day in accordance with paragraph 5.2.3) forecast and notify to Users:

- (a) in the case of a DN Operator, demand in each relevant LDZ;
- (b) in the case of National Grid NTS, demand for the Total System

for the Gas Flow Day, using Short Term Demand Models, on the basis of the weather data most recently obtained in accordance with paragraph 5.1 (in the case of LDZ demand, for the weather station(s) located in or closest to the relevant LDZ).

- 5.2.2 A "**Short Term Demand Model**" is a mathematical model established by the Transporters on the basis of historic demand and other data, which estimates (at a given time) for an LDZ and the Total System and for any Day demand, by reference to data including:

- (a) forecasts of temperature and wind speeds for the Gas Flow Day or the remainder thereof;
- (b) recorded temperature and wind speeds for the Preceding Day and (where relevant) the Gas Flow Day up to the time of forecasting; and
- (c) actual demand (assessed by reference to gas flows at NTS/LDZ Offtakes adjusted for estimated changes in LDZ stock) for the Preceding Day and (where relevant) the Gas Flow Day up to the time of forecasting.

- 5.2.3 The Transporter will notify demand under paragraph 5.2.1 after receipt of weather data under paragraph 5.1.1 not later than the following times: 14:00, 18:00 hours, and 02:00 hours on the Preceding Day and 12:00 hours, 15:00 hours, 18:00 hours, 21:30 hours and 02:00 hours on the Gas Flow Day.

- 5.2.4 The Transporter may in addition and at its discretion notify demand (for a relevant System) at other times for any reason it considers appropriate including, but not limited to, where it appears to the Transporter that the prevailing Forecast LDZ Demand may be substantially inaccurate; and where it does so it will inform Users of the reasons for its view.

- 5.2.5 Where there is a delay in the provision of forecast and other information to the Transporter as described in paragraph 5.1, the Transporter may defer the time at which it notifies demand under paragraph 5.2.3 by a commensurate period.

- 5.2.6 For the purposes of the Code:

- (a) "**Forecast LDZ Demand**" means aggregate demand for the Gas Flow Day in an LDZ, forecast in accordance with this paragraph 5;

- (b) **"Forecast Total System Demand"** means aggregate demand for the Gas Flow Day on the Total System, forecast in accordance with this paragraph 5;
  - (c) **"Demand Forecast Time"** means any time at which (in accordance with paragraph 5.2.3 or 5.2.4) the Transporter notifies Forecast LDZ Demand under paragraph 5.2.1.
- 5.2.7 In forecasting demand under this paragraph 5, the Transporter will act in good faith and will exercise reasonable skill and care, but the Transporter will not be liable (as to any loss or liability incurred by a User or otherwise) to any User in respect of or in consequence of anything done or omitted to be done by the Transporter under this paragraph 5.