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NTS Optional Wheeling Charge Methodology

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Document Revision History

Version / Revision Number	Date of Issue	Notes
V1.0	April 2019	Version to accompany workgroup report for 0678I
V1.1	April 2019	Updates following proposer inputs. Inclusion of indexation. Corrections.

Contents

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Introduction

1. The NTS Optional Wheeling Charge (OWC) Methodology has been produced by National Grid on behalf of the proposer of UNC Modification 0678I. This includes proposer inputs to amend the NTS Optional Commodity Charge calculation, which is applied to updated cost data from National Grid.

2. The NTS OWC Methodology will provide for alternate entry and exit capacity charges at applicable entry and exit system points. This methodology provides the four constants for the formula contained within the Uniform Network Code.

3. The NTS OWC is calculated by applying an equation which relates to the cost of providing pipeline capability to support a particular load size and distance travelled from a nominated NTS Entry Point to the particular NTS Exit Point to derive a unit cost in pence per kWh. The resultant cost from the equation is converted into a capacity cost by application of the site specific FCC and MNEPOR.

4. The Wheeling charge is a conditional capacity charge requiring the elected entry and exit point to be situated in the same location. The formula is designed to take into account the estimated costs of laying and operating a dedicated pipeline of an appropriate specification and also takes into account a range of flow rates and pipeline distances. Although the Wheeling charge is applicable for routes across zero distance, these fundamental assumptions remain valid, therefore a cost element that still including a distance factor set to zero is retained.

5. The requirement to have an NTS OWC Methodology is specified in Section Y Part A-I of the Transportation Principal Document (TPD) of the Uniform Network Code (UNC).

6. This document provides a guide to the NTS OWC and the information that is contained within the tables that provide the source data for the calculations contained within the UNC.

7. The spreadsheet embedded within this document is provided for illustration purposes only and it shows how the formula contained within the Uniform Network Code can be created but does not necessarily exactly replicate the formula. It provides a breakdown of how these figures have been calculated based on the publicly available input data values where applicable.

8. The methodology described below provides a guide to each step in the calculation of the price function. The values for each step in the spreadsheet, are based on those used for the introduction of the NTS Optional Commodity Charge in 1998.

9. Indexation of the 1998 costs used as a basis in the model is achieved through the application of Retail Price Index (RPI) data. Cost inputs will be updated for the relevant charging period using publicly published RPI figures[1] i.e. for the Gas Year beginning October 2020 the cost inputs will be updated using RPI from the 12 month period ending 31 January 2020. For each subsequent 12 month period the cost inputs will be updated using RPI from the previous 12 month period ending 31 January.

10. The Uniform Network Code Section Y Part A-I, paragraph 5, contains the price function which is made up of two elements both of which are related to load size. The first element is related to the geographical distance from the local terminal to the site. The second element is based on those costs which do not vary with distance (e.g. metering, telemetry, terminal connection, volumetric control). From these two elements four constant numeric values are derived for the price function.

11. The UNC Section Y Part A-I, paragraph 5, also sets out:

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[1] For details, see https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/chaw/mm23

- How the Maximum NTS Exit Offtake Rate (MNEPOR) and Forecasted Contracted Capacity (FCC) is incorporated within the formula

12. The information set out in this Methodology is prepared by National Grid Gas Transmission and the Document Control Section records changes which have been made to the document.

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Methodology

13. There are 11 steps followed to produce the information for the price function. The steps outlined below relate to the corresponding numbered sections in the spreadsheet (embedded in paragraph 14). There are a number of estimated embedded costs in the model. In aggregate these costs are there to cover maintenance and they are estimated based on the pipe size and distance.

Step 1: Pipeline Diameters for a range of distances and peak-day flowrates
This table shows the pipe diameters in mm required to meet a range of typical peak day flowrates for a range of pipeline distances

Step 2: Pipe-laying Unit Costs
This table contains the unit costs per km (£/km) for laying pipes of different diameter sizes. These are updated for the relevant charging period via indexation using publicly published RPI figures.

Step 3: Maintenance costs
This table shows non-distance related costs for each of the peak day flowrates for the different pipe diameters. (Costs included for example: pipeline connection, pig traps, calorimetry, pressure reduction and volumetric control). These are updated for the relevant charging period via indexation using publicly published RPI figures.

Step 4: Total Capital Costs for a range of distances and peak-day flowrates
This table calculates the total capital cost for a range of distances and peak day flowrates. This is done by multiplying the pipe laying unit (£/km) cost from step 2 by the distance and adding the non-distance related cost from step 3. Additional costs are included for pipeline distances at 25km and over, with an extra increment being added at 50km, to reflect additional costs as distance increases.

Step 5: 10 Year Discount Factor
The 10 Year Discount Factor is calculated and used to create the annuitised costs in Step 6.

Step 6: Annuitised Costs
This table calculates the total project cost per annum made up of annuitised capital costs and ongoing (revenue) costs using the inputs from step 4 and the 10 Year Discount Factor from step 5.

Step 7: Ongoing Operational Costs
This table calculates the ongoing costs of the hypothetical pipeline based on a number of assumptions and estimates. These costs increase in steps based on flow rates and distances.
The costs included in this table are:
The annuitized costs from step 6 + (plus)
  a) 1% of the pipeline total distance costs (step 4) minus the maintenance costs (from step 3), is added to all the distance and flow rate combinations;
  b) 2.5% of the maintenance costs (from step 3), is added to all the distance and flow rate combinations;

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c) £17,310 Per km is added to all those with a distance greater than 0km
d) £60,585 is added to all those with a distance greater than 0km
e) £69,241 is added to all those with a flow rate between 1 and 5 mcmd, inclusive
f) £138,481 is added to all those with a flow rate between 7 and 60 mcmd, inclusive.

Step 8: Supply point capacities
This table calculates the supply point capacities using a load factor of 75% of the SOQ (SOQ is Maximum NTS Exit Point Offtake Rate (MNEPOR) converted into kWh/day at the site). This is used to calculate the Annual Quantity AQ in GWh that will be used to calculate the cost per kWh.

Step 9: Cost per kWh
This table divides the annuitised ongoing costs in step 7 by the annual quantities corresponding to the supply point capacities using a load factor of 100% to generate a matrix of unit cost in step 8 (supply point capacities), expressed in p/kWh for a range of supply point capacities and distances.

Step 10: Function Calculation
This section calculates the distance and non-distance related parts of the function by means of regression analysis. The functions are expressed as power relationships. The zero distance p/kWh is from step 9. The distance related average p/kWh is calculated by subtracting the 0km cost per kWh value from the 50 km cost per kWh in step 9 and dividing by 50.

These are used to create linear equations that represent the non-distance and distance related elements of the NTS OCC function and can be expressed as within the formula in step 11. The gradient and intercepts from each of the linear equations can be expressed:

	Distance	Non-distance
Gradient	E1	E2
Intercept	A	B

Step 11: NTS OWC Formula
This section contains the NTS OWC formula that is produced from the previous steps. The formula is made up of the gradient and intercepts values from the two linear equations (non-distance and distance related) described in Step 10.

$$\text{NTS OWC} = A \times M^{E1} \times D + B \times M^{E2}$$

The values for A, E1, B & E2 are obtained from the linear equations detailed in the function calculations in Step 10.

M and D are defined within the UNC Section Y Chapter 3, paragraph 5

14. The NTS Optional Wheeling Charge Formula - Illustrative Tables

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