1. Model Assumptions and Input Data

In this note we outline the GTCR model assumptions. We document the model assumptions and the source of input data according to the following sub-headings:

- cross-border flow transaction costs;
- NTS capacity, network and peak supply data;
- allowed revenue;
- supply assumptions and data; and
- booking strategy assumptions.

We consider each element in turn.

1.1. Cross border flow transaction costs

GTS Entry Charge	
Description	Entry charge paid for cross-border flows from GB to the Netherlands.
Value	0.194
Units	€/kWh
Source	http://www.gasunietransportservices.nl/en/products-services/terms-and-conditions/tsc

Bacton Beach short-haul	
Description	Short-haul tariff for Bacton
Value	0.02
Units	p/therm
Source	IUK response to Ofgem call for evidence on use of GB gas interconnectors https://www.ofgem.gov.uk/ofgem-publications/59256/iuk-response-call-evidence-use-gas-interconnectors-gbs-borders.pdf

IUK Transport costs	
Description	Transportation charge for use of IUK forward and reverse flow capacity
Value	0.5 (0.02 p/kWh)
Units	p/therm

IUK Transport costs	
Source	IUK response to Ofgem call for evidence on use of GB gas interconnectors https://www.ofgem.gov.uk/ofgem-publications/59256/iuk-response-call-evidence-use-gas-interconnectors-gbs-borders.pdf

BBL Transport costs	
Description	Transportation charge for use of BBL forward and reverse flow capacity. Acts as an input to the cross-border flow arbitrage decision process.
Value	0.025
Units	p/kWh
Source	Ofgem assumptionhttp://www.gasunietransportservices.nl/en/products-services/terms-and-conditions/tsc

1.2. NTS capacity, network and peak supply and demand data

Obligated capacity	
Description	Baseline NTS Entry Capacity (obligated) – as defined by National Grid's Gas Transporters Licence – plus capacity substitution and legacy TO entry capacity. Bacton Obligated capacity is split according to size of technical capacity of IUK and BBL. Remaining capacity is allocated to Bacton Beach (non-CAM point). As per Ofgem 'Options for Great Britain's implementation of the European Union Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems (Regulation 984/2013) at the Bacton entry point.
Value	Various – varies by ASEP and financial year
Units	GWh
Source	NGG Transportation Licencehttp://www.gasunietransportservices.nl/en/products-services/terms-and-conditions/tsc Bacton split - https://www.ofgem.gov.uk/publications-and-updates/options-great-britain%E2%80%99s-implementation-european-union-network-code-capacity-allocation-mechanisms-gas-transmission-systems-regulation-9842013-bacton-entry-point-0

Peak supply and demand	
Description	Peak supply and demand flows by ASEP and financial year (current version of model is populated under the Slow Progression scenario).
Value	Various – varies by ASEP and financial year
Units	GWh
Source	National Grid 2013 Gas Ten Year Statement http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/Gas-Ten-Year-Statement/

Existing QSEC bookings	
Description	QSEC bookings (baseline and incremental) by ASEP by financial year quarter. Existing QSEC bookings at Bacton CAM and Bacton Beach are split using the same proportions as used to split obligated capacity.
Value	Various – varies by ASEP and financial year
Units	GWh/day
Source	National Grid – input data in model derived from CEPA calculations and analysis

Short term bookings	
Description	Includes input data for MSEC bookings, DADSEC bookings, WDDSEC Bookings and DISEC bookings. Actual bookings for the financial year 2013/14 are used in the model whilst future years are an output of the booking strategy modelling. Outputs from the booking strategy modelling are input in the Short Term Bookings worksheet as these are inputs to future tariff calculations.
Value	Various – varies by ASEP and financial year
Units	GWh/day
Source	National Grid – input data in model derived from CEPA calculations and analysis

Nodal Marginal Distance	
Description	Output of the Transportation model when running under the peak supply and demand scenario for the financial year. These are used to calculate final tariffs under the floating tariff adjustment policy options.

Nodal Marginal Distance	
Value	Various – varies by ASEP and financial year
Units	Kilometres (km)
Source	CEPA analysis of NGG Transportation model run under a Slow Progression scenario

Initial price schedule	
Description	Output of the Transportation model when running under the peak supply and demand scenario for the financial year. These are the 50:50 adjusted reserve prices that currently applied in QSEC auctions. They are derived from applying the Slow Progression scenario peak supply and demand data sourced from the Ten Year Statement.
Value	Various – varies by ASEP and financial year
Units	p/kWh/day
Source	CEPA analysis of NGG Transportation model run under a Slow Progression scenario

Expansion constant	
Description	The capital cost of the transmission infrastructure investment required to transport 1 GWh over 1 km. Its magnitude is derived from the projected cost of an 85bar pipeline and compression for a 100km NTS network section. The GTCR model takes the Transportation model expansion constant applicable for 2017/18 and indexes it for previous and future years to inflation.
Value	Various – varies by ASEP and financial year
Units	£/GWhkm
Source	CEPA analysis of NGG Transportation model run under a Slow Progression scenario

1.3. Allowed revenue

Inflation	
Description	RPI forecast used to uplift allowed revenues into nominal prices in future tariffing years
Value	3 per cent
Units	Per cent
Source	CEPA assumption – can be varied in the model (as applied to

Inflation	
	the uplift of allowed revenue)

TO allowed revenue	
Description	The Transporter Owner allowed revenue to be recovered from NTS capacity and commodity charges (where applicable). We take the allowed revenue figures for RIIO-T1 for the years 2014/15 to 2020/21 then assume allowed revenues remain constant in 09/10 prices from 2021/22 onwards.
Value	Various – varies by financial year
Units	£m - 09/10 prices
Source	Ofgem, Final RIIO-T1 determination

SO allowed revenue	
Description	The System Operator allowed revenue to be recovered from NTS capacity and commodity charges (where applicable). We take the allowed revenue figures for RIIO-T1 for the years 2014/15 to 2020/21 then assume allowed revenues remain constant in 09/10 prices from 2021/22 onwards.
Value	Various – varies by financial year
Units	£m - 09/10 prices
Source	Ofgem, Final RIIO-T1 determination

Excluded services revenue	
Description	Services provided by the licensee as part of its business in respect of which the charges may be treated as falling outside the scope of the charge restrictions otherwise imposed by or under the licence.
Value	£3m - Fixed (09/10 price) assumption for all years
Units	£m - 09/10 prices
Source	Ofgem, Final RIIO-T1 determination

Pass through costs	
Description	Costs that are a pass-through under the charge restriction of the Transporter licence
Value	£19.5m - Fixed (14/15 price) assumption for all years

Pass through costs	
Units	£m - 14/15 prices
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

Output incentive	
Description	Revenues earned by the Transporter under the financial incentives of the price control.
Value	£0m - Fixed assumption for all years
Units	£m - 14/15 prices
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

K-Factor	
Description	Adjustment to allowed revenues to account for an under or over recovery in the previous year. The model could determine the K-factor based on previous year over and under recoveries.
Value	£0m – for 2014/15 and all years subsequent. To potentially include the functionality to capture a value that is determined within the model.
Units	£m
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

DN Pensions	
Description	Pensions deficit charge as allowed under the price control arrangements.
Value	£42.5m - Fixed (14/15 prices) assumption for all years
Units	£m - 14/15 prices

DN Pensions	
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Charging-Statements/

Metering	
Description	Revenue allowance under the Transporter price controls for metering costs.
Value	£1.7m - Fixed (14/15 price) assumption for all years
Units	£m - 14/15 prices
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

Constraint management CM	
Description	Revenue allowance under the Transporter price controls associated with constraint management.
Value	£31.3m - Fixed (14/15 price) assumption for all years
Units	£m - 14/15 prices
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

S0 external incentive adjustment (SOOIRC)	
Description	Revenue allowance under the Transporter price controls associated with System Operator incentives.
Value	£131m - Fixed (14/15 price) assumption for all years
Units	£m - 14/15 prices
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

SO Transportation Support Services revenue adjustment (TSS)	
Description	Revenue allowance under the Transporter price controls associated with support services
Value	£8.7m - Fixed (14/15 price) assumption for all years
Units	£m - 14/15 prices
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

Reductions for SO capacity	
Description	Revenue adjustments by three categories – non-obligated, legacy entry and legacy exit.
Value	£0.6m; £4.6m; £10.6m respectively - Fixed (14/15 price) assumption for all years
Units	£m - 14/15 prices
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

Neutrality adjustment	
Description	Revenue adjustment for balancing neutrality charge and Capacity neutrality revenue(both allowance and revenue - so ignored)
Value	£6m - Fixed (14/15 price) assumption for all years
Units	£m - 14/15 prices
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

Other SO revenue adjustments	
Description	Includes Buyback cost recovered via Capacity neutrality, St

Other SO revenue adjustments	
	Fergus Compression and Short-haul.
Value	£0m; £14.7m; £16.6m respectively; Fixed (14/15 price) assumption for all years
Units	£m - 14/15 prices
Source	National Grid charge setting report (Indicative Notice October 2014) http://www2.nationalgrid.com/UK/Industry-information/System-charges/Gas-transmission/Tools-and-Models/

1.4. Supply assumptions and data

UK Continental Shelf – annual supply capability	
Description	Total volume of gas available from the UKCS for each year in the model. Model is currently run from Slow Progression but Gone Green scenario can also be selected in the model control sheet.
Value	Various
Units	GWh
Source	National Grid 2013 Gas Ten Year Statement http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/Gas-Ten-Year-Statement/

UK Continental Shelf – mix of gas fields	
Description	Modelling of the value of constraint requires assumptions of the volume of gas that is sourced from Associated, Condensate and Dry Gas fields. The model currently is populated with numbers which assume 20% of volumes are Associated Gas based, 20% of volumes Condensate based and 60% Dry Gas field based.
Value	Fixed assumption but can be varied by ASEP
Units	Proportion factor
Source	CEPA estimate based on DECC gas field production data for 2013/14

Norway – annual supply capability	
Description	Total volume of gas available from Norway imports for each

Norway – annual supply capability	
	year in the model. Model is currently run from Slow Progression but Gone Green scenario can also be selected in the model control sheet.
Value	Various
Units	GWh
Source	National Grid 2013 Gas Ten Year Statement http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/Gas-Ten-Year-Statement/

Proportion of Norway contracted supplies to GB	
Description	Proportion of annual supply capability contracted to flow to the GB market.
Value	90%
Units	Proportion factor
Source	CEPA assumption – can be varied within the model Annual volumes are derived from National Grid 2013 Gas Ten Year Statement

Proportion of Norway arbitrage supplies available to flow to GB	
Description	Proportion of annual supply capability with flow optionality to the GB market subject to arbitrage rule.
Value	10%
Units	Proportion factor
Source	CEPA assumption – can be varied within the model Annual volumes are derived from National Grid 2013 Gas Ten Year Statement

Milford Haven daily supply capability	
Description	Maximum dispatch quantity on each day set equal to ASEP obligated capacity level.
Value	950 GWh/day
Units	GWh/day
Source	CEPA assumption – can be varied within the model

Isle of Grain daily supply capability

Isle of Grain daily supply capability	
Description	Maximum dispatch quantity on each day set equal to ASEP obligated capacity level.
Value	700 GWh/day
Units	GWh/day
Source	CEPA assumption – can be varied within the model

1.5. Booking strategy assumptions

Gas field profit margin	
Description	Upstream profit margin on the traded price at the beach associated with the ASEP.
Value	50% - Fixed assumption
Units	Percentage
Source	CEPA assumption – can be varied within the model

Gas price at ASEP	
Description	The traded gas price at an ASEP used to derive the expected value of a constraint.
Value	30p/therm for Associated Gas; 35p/therm for Condensate Gas; 40 p/therm for Dry Gas
Units	p/therm
Source	CEPA assumption – can be varied within the model

Value multiplier for gas field	
Description	Value multiplier achieved by the shipper from the traded spread between the NBP price and the beach ASEP price.
Value	95% for Associated Gas; 100% for Condensate Gas; 105% for Dry Gas
Units	Percentage
Source	CEPA assumption

Oil production assumption for Associated Gas fields	
Description	Oil production for a given volume of gas production (as determined by flow modelling).
Value	1000

Oil production assumption for Associated Gas fields	
Units	bb/MMscfd
Source	CEPA assumption – can be varied within the model
Liquids production assumption for Associated Gas fields	
Description	Liquids production for a given volume of gas production (as determined by flow modelling).
Value	0
Units	bb/MMscfd
Source	CEPA assumption – can be varied within the model

Liquids production assumption for Condensate Gas fields	
Description	Liquids production for a given volume of gas production (as determined by flow modelling).
Value	100
Units	bb/MMscfd
Source	CEPA assumption – can be varied within the model

Liquids production assumption for Dry Gas fields	
Description	Liquids production for a given volume of gas production (as determined by flow modelling).
Value	3
Units	bb/MMscfd
Source	CEPA assumption – can be varied within the model

Oil profit margin	
Description	Profit on the traded value of oil production from an Associated Gas field
Value	50%
Units	Percentage
Source	CEPA assumption – can be varied within the model

Liquids profit margin	
Description	Profit on the traded value of liquids production from an Condensate and Dry Gas field

Liquids profit margin	
Value	50%
Units	Percentage
Source	CEPA assumption – can be varied within the model

Liquids price	
Description	Traded value of liquids production from an Condensate and Dry Gas field
Value	100
Units	$/bbl
Source	CEPA assumption – can be varied within the model

Oil production price	
Description	Assumed traded value of oil production from Associated Gas fields.
Value	100
Units	$/bbl
Source	CEPA assumption – can be varied within the model

MRS ASEP Supply Value multiplier	
Description	Value achieved on an underlying summer winter intrinsic value (“Margin Spread”) of a gas storage facility trade
Value	220%
Units	Percentage
Source	CEPA assumption – can be varied within the model

MRS Margin Spread	
Description	Value achieved on an underlying intrinsic value summer winter hedge for a gas storage facility
Value	220%
Units	Percentage
Source	CEPA assumption – can be varied within the model