Gas Transmission Charging Review

A discussion document by Storengy UK

1- Context

Storengy UK, a fully owned subsidiary of Engie, is operating one of the largest gas storage facilities in the UK.

The situation of storage operators in the UK is already problematic with disproportionate business rates scheduled to improve very slowly in the coming years and a market value (seasonal spreads and shorter-term volatility) that reflects only partially the real value provided by gas storage to the gas system and the end users.

Although these two elements are not the subject of the transmission tariff regime, it is important to keep in mind the economic context in which the Charging Review will apply, to understand its potential impact. The rules currently tabled for in the UNC Draft Modification 621 propose a level of 50% for the discount of tariffs applicable to storages. This level, which corresponds to the minimum of the permitted range of the EU regulation, is clearly not adapted to the GB market, where storage benefits have been recognised though the exemption of TO and SO commodity charge. The tabled proposal represents a substantial change threatening the sustainability of the last few gas storage assets of the UK, already near the tipping point. The additional strain on storage economics posed by adverse future tariffs to an already precarious situation will have a disastrous impact both on the storage businesses and on the end users of gas and electricity in GB.

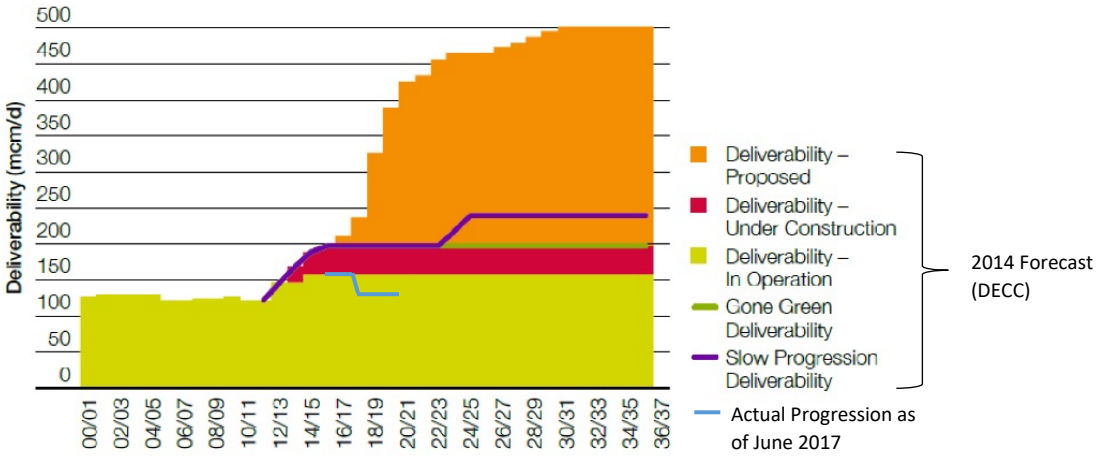
Following the March 2017 position paper on the NTS CMF gas charging review published by Storengy UK, this document intends to open the discussion to set the storage discount (Article 9 of the TAR NC). Storengy's view is that the level of the discount should be at 100%.

2- Scope: Storage capacity on the GB Gas Market

The storage capacity of the UK currently stands at 14 TWh[1], following the closure of the Rough seasonal storage. Considering the time required to develop a storage project, and the fact that no FID has been taken over the last 10 years, this capacity may not grow by more than 2 TWh within the 5 next years in the most optimistic scenario (de-mothballing and completion of caverns). As can be seen in Appendix 1, a few proposed storage projects have been around for some time, but the extremely adverse environment for gas storage in GB makes a FID highly unlikely for the time being. The following forecast based on a 2014 DECC publication shows that all projects have been shelved or cancelled, and that the existing asset base has started to shrink. Additionally, UK storage owners have had to impair most of the book value of their UK storage plants, reflecting the lasting unfavourable conditions this asset class faces.

[1] Appendix 5 of National Grid 2016 Ten Year Statement, taking account of Rough closure.

2014 assessment of existing and proposed UK gas storage



Source: DECC 2014 UK Risk Assessment on Security of Gas Supply & Storengy UK 2017 update

The **14 TWh of storage space** are now exclusively composed of Medium Range Storages (MRS), which **are cycled around 3 times per year on average**. This means that over each 12-month period, the volume is injected 3 times and withdrawn 3 times on average**.**

3- Financial impact of the "Storage Discount" (Art 9 of EU Network Code TAR) in GB

Because storages respond to supply-demand imbalances, NTS Entry and Exit capacity bookings by storage users will occur on a daily, pay-as-you-go basis, rather than on a monthly or quarterly basis. An explanation of capacity booking requirements from MRS is provided in Appendix 2. Assuming stability of 3 storage cycles per annum, MRS users would thus require capacity booking of 42 TWh of NTS Entry and 42 TWh of NTS Exit of the total capacity booking[2]. While it is not possible to estimate exactly how much NTS capacity would be booked for the entire network after the implementation of the future charging regime, we can use the NTS throughput as a proxy for the minimum. According the the 10-year Statement, some 850 TWh of gas are transported annually. This means storage flows represent less than 5% of NTS entry flows and 5% of NTS exit flows.

With CWD Price methodology or a Post Stamp Price approach, the 5% share of Storage in NTS bookings represents broadly the share of NTS TO revenues to be recovered from storage users, before application of the storage discount. However, the actual share of TO revenues collected from storage users will be much lower than 5% for the following reasons:

- Total NTS bookings can only be higher than (or equal to) NTS throughput.
- Storage developers have already booked NTS bookings over a long period as they needed to trigger the release of NTS Entry capacity. These large amounts of Entry Capacity bookings will

[2] Storage Capacity (14 TWh) x Number of Cycles (3) = 42 TWh. By comparison, in the Transmission Services CWD Model v1.3 provided by National Grid, the sum of average "Historical Entry Flow Levels" for the entry points Barton Stacey, Cheshire, Garton, Hole House Farm, Hornsea and Hatfield Moor is 106 GWh/d, which equates to 38.8 TWh per year.

be grandfathered under Article 35 of the EU Tariff Network code, reducing the need for new bookings from storage users.

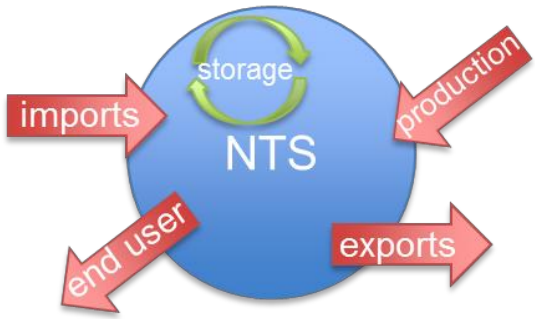
- The demand for NTS capacity from storage users is highly elastic, and even a small increase in tariff would destroy a large part of the demand for NTS capacity. With the proposed storage discount of 50% in the Draft Mod 621, the cycling of MRS storages would dwindle as transaction costs become higher than the profit of short term spreads. The tariff of capacity booked on-a-pay-as-you-go basis will act as a barrier to trade gas for short term balancing, where unit profit margins are slim. The time spreads traded for short term balancing of the grid are typically in the range 0.5-1.5 p/th, with variable costs charged by storage operators around 0.5 p/th[3]. This would entice MRS to adopt a single seasonal cycle.

The amount smeared on NTS entry and exit points resulting from the application of the storage discount is thus very limited. Assuming a 100% discount, the TO revenue to be spread on other entry and exit point would be at most 2%. This represents an increase of only 1% on the minimum requirement of 50% discount for storage. Using an allowed revenue assumption of £867m for the gas year 2019/20, **setting the discount at 100% represents £8m**.

This is a very small amount compared to the benefits detailed in paragraph 5.

4- Charging Methodology: storage of gas is simply parking en-route to the end consumers

Following the GTCR, the Capacity Weighted Distance (CWD) methodology is likely to replace the Long Range Marginal Cost (LMRC) methodology to set transmission tariffs. We agree that CWD methodology is more appropriate to allocate the costs of a network with declining demand. However, the allocation of costs must not penalise gas storage embedded in the system. Gas in the NTS has already been charged, there is no reason to charge further gas flows to and from a parking embedded within the NTS, which is in essence providing relief to the system by responding to supply-demand price signals.



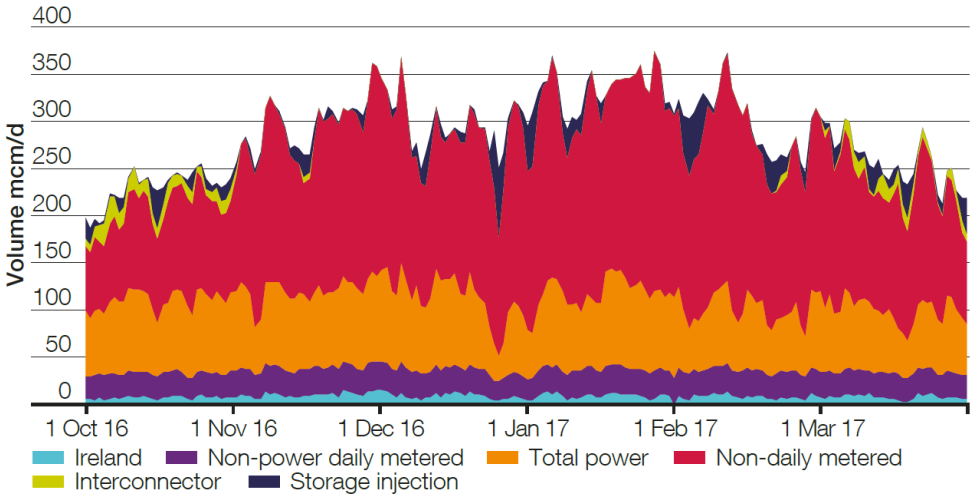
Gas is imported and directly delivered to the end user or exported	Gas is imported and stored before being delivered to the end user or exported
Gas price + 100% entry fee to the NTS + 100% exit fee of the NTS	Gas price + 100% entry fee to the NTS + (1-x)% exit fee from NTS to storage + (1-x)% entry fee from storage to NTS + 100% exit fee of the NTS

The use of storage is essentially a time spread trade at the NBP, and is not causing investment requirement for the network:

- The “off peak” NTS exit capacity usually booked by storage users reflects the counter-cyclical nature of the storage demand on the transport system. Exit points for storages have either zero or a very small Baseline Obligation (BFLEC) and Incremental Obligation (IFLEC). The storages absorb surplus gas when demand is insufficient, using network capacity temporarily

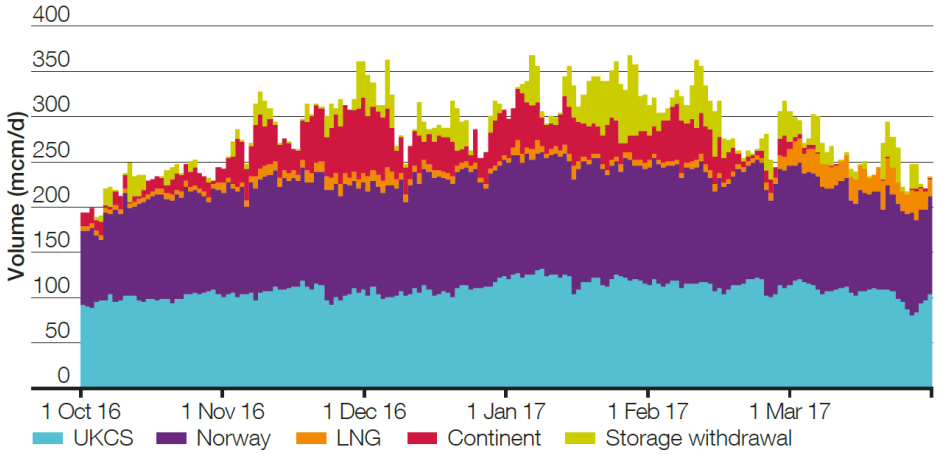
[3] Storengy UK published price for the storage year 17/18 is 0.25 p/th for injection and 0.25 p/th for withdrawal.

left unused. The graph below shows the timing of storage injections over the last winter, which occurred always at time of lower demand.



Breakdown of NTS demand in Winter 2016/17
Source: National Grid 2017 Winter Outlook and Consultation document

- On the NTS entry side, the withdrawals from storage match the system requirements at times of high demand, as can be seen on the following graph. The gas can thus be physically consumed locally upon re-entry into the network, without requiring long distance transport. The deliverability of a storage site, typically in a range from 10 to 20 mcm/d is comparable to the daily consumption of a large city.



Breakdown of NTS Supply in Winter 2016/17
Source: National Grid 2017 Winter Outlook and Consultation document

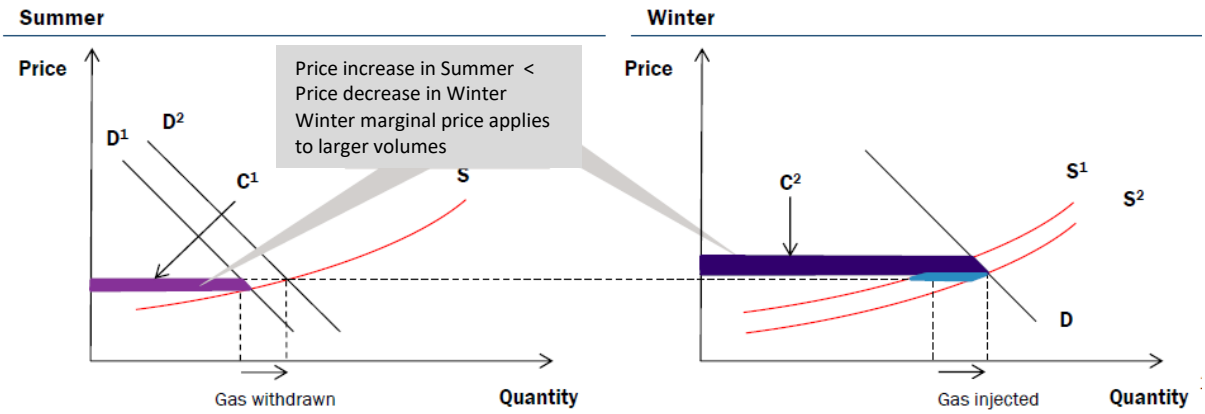
At European level, there is a growing understanding that allocation of network costs to points at the borders of entry – exit systems is hampering trade, efficient balancing and security of supply. The findings of the Quo Vadis study[4] commissioned by the EU Commission confirm this view. While it is still premature to anticipate a change of direction of the European charging methodology between entry and exit systems, **this clearly points out the negative impact on trade and balancing that the application of unfavourable entry – exit tariffs to storage located within the NTS would cause**.

[4] https://ec.europa.eu/energy/en/studies/study-quo-vadis-gas-market-regulatory-framework

5- Benefits to the system: avoided network investment, lower end user prices, reduction of volatility and efficient balancing regime

Previous studies[5] carried out by WWA on behalf of GSOG have argued that storage provides a benefit to the transmission system in terms of avoided investment in additional capacity. The benefits, in the form of **investment savings** were in the region of **£40m to £70m per annum**. In a study[6] of transportation tariff discounts for gas storage, Pöyry estimates that European transmission network and importation infrastructure would need to be 9% to 16% bigger. Applying this ratio to the TO allowed revenue of the GB network for gas year 2019/20, corresponds to **investment savings** between **£80m to £140m per annum.**

In the 2016 10-year statement[7] published by ENTSO-E the benefits of new interconnections of electricity markets are said to significantly outweigh their costs: 1.5 to 5 €/MWh benefits vs. "*1.5 to 2 €/MWh (…), about 2% of the bulk power prices or less than 1% of the total electricity bill*". The parallel can be made with the gas market where the storage of energy plays a similar role to electricity interconnections in damping price spikes by adjusting supply to demand, as can be shown on the graph below. In the case of the GB gas market, the welfare provided by storage has not been quantified. However a similar net positive contribution to the social welfare of 1% of the GB retail gas bills[8] represents **£224m per annum**.



Source: FTI Consulting, June 2017 Flame Conference presentation

In addition to the level of prices at times of high demand, the storages also lower price volatility. The cost of volatility is priced in by retailers and passed on to consumers. In a 2012 study of GB gas security and gas market arrangements, Pöyry[9] estimated the reduction in gas price volatility caused by storage in Great Britain to be 13% on average. Assuming the commodity component of the retail price includes a 8% mark-up on the wholesale prices set aside by suppliers to cover the balancing risks at the time the contract is locked in, the lower price volatility translates into savings[10] over 1%

[5] WWA, UK gas transmission system benefits from gas storage – an update to the initial report produced in 2007, April 2014 and UK Gas Transmission System Benefits from Gas Storage, September 2007
[6] http://www.poyry.com/sites/default/files/528_gb_gas_security_and_market_arrangements_v1_0.pdf
[7] http://tyndp.entsoe.eu/projects/2016-12-20-1600-exec-report.pdf
[8] 2.8 p/kWh x 800 TWh = £224m
[9] http://www.poyry.com/sites/default/files/528_gb_gas_security_and_market_arrangements_v1_0.pdf
[10] 8% of wholesale price x (–13%) reduction in volatility = -1.12%

on the commodity component passed to customers. Taking a price of 45 p/th for the gas (1.535 p/kWh), this 1% **reduction in balancing costs** is worth **£122m per annum** on GB end users' bills.

Since the 2011 implementation of the UNC Modification 0333A, the Default System Marginal Price (SMP) reflects the cost of linepack flexibility, considered to be NTS compressors and pipeline space. The Default SMP for the gas year 2016/17 was set at 0.0397 p/kWh (1.16 p/th), which provides an incentive for network users to balance the grid without intervention of the TSO. Storage users incur variable fees when they inject and withdraw gas into and from storages, but the total marginal costs (storage operations + NTS capacity without commodity charge) are currently lower than the Default SMP. As argued by National Grid in the final Modification Proposal[11] "*Reducing the incentive to balance **will lead to greater industry costs through imbalance charges and residual balancing actions***". The risk is for the Default SMP to become the next most competitive source of balancing for participants, when short-term import flexibility (imported gas from UKCS, NCS, LNG…, which can be adjusted for a just-in-time delivery into the NTS without incurring a double charging of NTS tariffs) is exhausted or does not respond, particularly in winter. These benefits have not been quantified.

The £8m annual cost of a 100% discount for storage is to be compared to a series of additive benefits ranging from £40m to £200m.

Conclusion:

While the specificities of the storage business have been recognised by the EU Network Code, a minimal application in GB of the storage discount provisions would severely harm a critical component of the energy system already facing major headwinds.

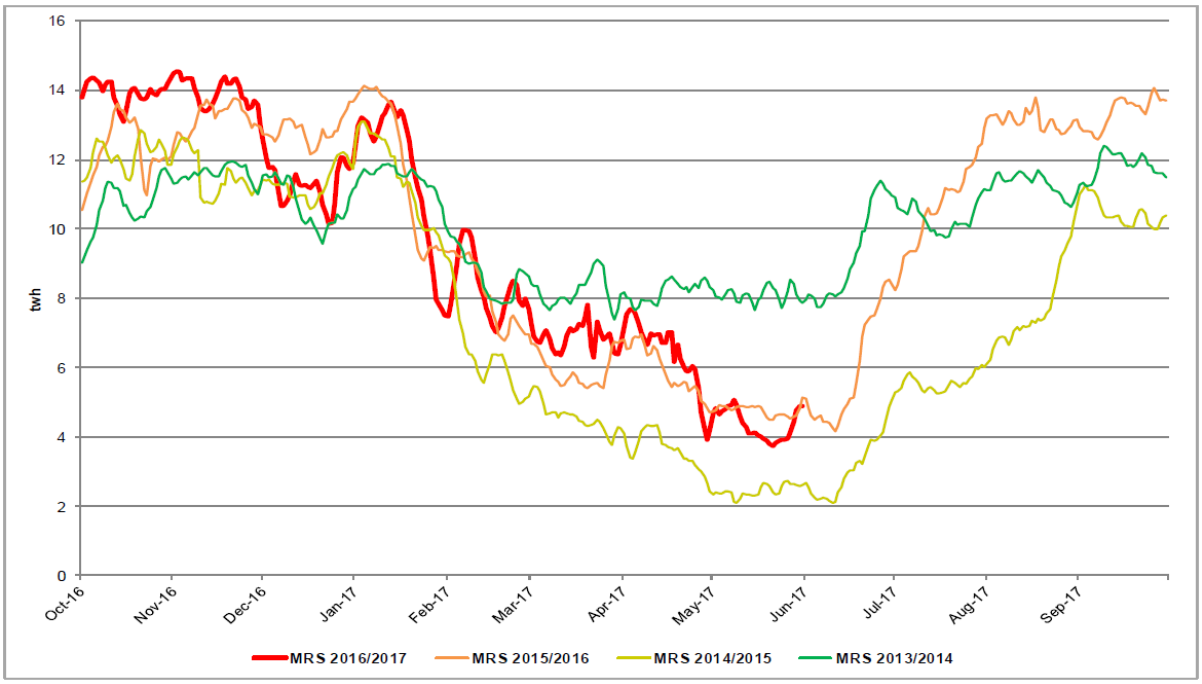
Although the GTCR intends to solve issues of the charging regime, gas industry stakeholders, and particularly storage operators are wary that unintended side effects will reshape the market. Consequently, a cautious approach is required, to smoothen any change and avoid operators being abruptly pushed out of business and the market deprived of physical assets.

Storengy UK proposes for storage users a transition from the current arrangements, in the form of a discount level initially set at 100% and reviewed after 5 years. This will generate no meaningful burden to NTS users while preserving the welfare provided by storages to end users and to the gas industry.

11 https://www.gasgovernance.co.uk/sites/default/files/ggf/Final%20Modification%20Report%200333%200333A%20including%20formal%20text%20v3.0.pdf

Appendix 1: GB Storage Capacity

MRS volume usage over the last 4 gas years



Source: National Grid Operational Forum Core Pack - June 2017

Existing Storage:

Project	Operator/ Developer	Location	Space (bcm)	Approximate max delivery (mcm/d)
Rough	Centrica Storage Limited	Southern North Sea	3.3	41
Aldborough	SSE/Statoil	East Yorkshire	0.3	40
Hatfield Moor	Scottish Power	South Yorkshire	0.07	1.8
Holehouse Farm	EDF Trading	Cheshire	0.022	5
Holford	E.ON	Cheshire	0.2	22
Hornsea	SSE	East Yorkshire	0.3	18
Humbly Grove	Humbly Grove Energy	Hampshire	0.3	7
Hill Top Farm	EDF Energy	Cheshire	0.05	12
Stublach	Storenergy	Cheshire	0.2	15
		Total	**4.7**	**162**

Proposed Storage:

Project	Operator/ Developer	Location	Space (bcm)	Status
Gateway	Stag Energy	Offshore Morecambe Bay	1.5	Planning granted, no FID
Deborah	Eni	Offshore Bacton	4.6	Planning granted, no FID
Islandmagee	InfrasStrata	County Antrim, Northern Ireland	0.5	Planning granted, no FID
King Street	King Street Energy	Cheshire	0.3	Planning granted, no FID
Preesall	Halite Energy	Lancashire	0.6	Planning granted, no FID
Saltfleetby	Wingaz	Lincolnshire	0.8	Planning granted, no FID
Whitehill	E.ON	East Yorkshire	0.4	Planning granted, no FID
		Total	**8.7**	

Source: National Grid 10-Year Statement 2016

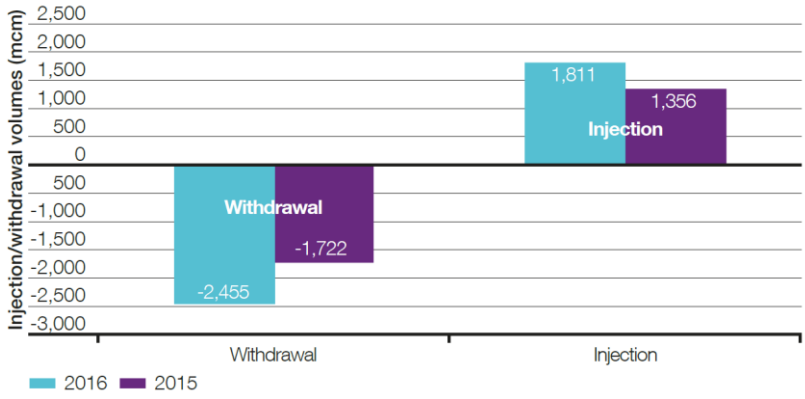
Appendix 2: Cycling of MRS and NTS capacity booking behaviour

Assessment of NTS booking requirements from storage users

Scenario	Number of cycling per year	NTS Entry bookings (TWh)	NTS Entry bookings (% of NTS Throughput)	NTS Exit bookings (TWh)	NTS Exit bookings (% of NTS Throughput)
No adverse impact from Gas Charging Review	3	42	4.7%	42	4.7%
Adverse impact of GCR resulting in seasonal use	1	14	1.6%	14	1.6%
Adverse impact of GCR resulting in storage closure	0	0	0%	0	0%

Assumption: NTS Throughput assumption: 890 TWh/year (Forecast Flows: Entry and Exit Flows April 19 to March 20 in the Non Transmission Services Charging Model 1,778,229 GWh)

Recent cycling of medium range storages: MRS injection and withdrawal volumes



Source: National Grid Winter Outlook

Booking behaviour (100% short term / 0% long term) will not depend on the level of multipliers. In all scenarios the load factor of long term capacity for storage users would be far too low to justify the cost of booking of stranded capacity.

Scenario	Number of cycling per year	Load factor of annual NTS capacity booking	Daily multiplier threshold to incentivize annual booking
No adverse impact from Gas Charging Review	3	3 x 30 / 365 = 25%	4
Adverse impact of GCR resulting in seasonal use	1	30 / 365 = 8%	12.5

Assumption: MRS with "30:30" product duration, whereby the daily capacity for injecting and withdrawing is 1/30th of the volume.