Unaccounted for Gas Report

April 2020

nationalgrid

Executive Summary

This report provides a review of National Grid's Unaccounted for Gas (UAG) management since April 2013, the start of the RIIO-T1 price control, with particular emphasis on 1st September 2019 to 29th February 2020 inclusive, the period since the publication of the October 2019 UAG report. It is published to meet National Grid Gas Plc (NTS) Gas Transporter Licence Special Condition 8E.

The total assessed UAG quantity for the September 2019 to February 2020 period is higher than for the previous six-month period. In addition, total monthly assessed UAG values have been greater than the long-term average (April 2013 to February 2020) monthly assessed UAG for five of the last six months.

It is expected that for Formula Year 2019/20 annual assessed UAG will be significantly greater than for 2018/19. Annual assessed UAG over the past six-month period was initially reflective of the 2016/17 period until months November and December where a significant increase in assessed UAG was observed.

National Grid continues to report post-reconciliation assessed UAG enabling a more accurate representation of UAG performance.

Continued support from meter owners has enabled National Grid to obtain and review meter validation information for NTS entry and exit facilities. This data is being used to support the identification of causes of UAG, to enhance National Grid's ability to detect meter error and to inform the preparation of future meter witnessing programmes.

A dedicated project team has been established to investigate the increase in assessed UAG levels that have been observed in the last six months. The project is still in its infancy and further updates will be provided in later UAG reports.

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Unaccounted for Gas Report - April 2020

Introduction

This report provides a review of National Grid's UAG management. The report provides information on assessed UAG quantities since April 2013, the start of the RIIO-T1 price control, with particular emphasis on 1st September 2019 to 29th February 2020 inclusive, the period since the publication of the October 2019 UAG report. It also describes the various activities and initiatives that National Grid has been undertaking or is planning to undertake to investigate the causes of UAG.

UAG is one of the three components of NTS Shrinkage together with OUG and CV Shrinkage (CVS). Further information on the components of NTS Shrinkage can be found on the National Grid website via the following link:
https://www.nationalgridgas.com/balancing/unaccounted-gas-uag.

To compliment this report, National Grid also provides a range of UAG related data including:

- all previous UAG reports;
- daily data on the components of NTS Shrinkage including UAG

which are available on the National Grid website via the above link.

This report and the UAG related data published on the National Grid website discharge National Grid Gas's responsibilities under the Gas Transporter Licence Special Condition 8E: Requirement to undertake UAG Projects to investigate the causes of UAG. Special Condition 8E is reproduced in Appendix I of the report. The relevant data used to produce the tables and graphs included in the report is provided or referenced in Appendix II.

If you have any feedback or questions on this document, please contact National Grid's Meter Assurance team via the following email address: meterassurance@nationalgrid.com. Meter Assurance, who are part of the Energy Balancing team within the National Grid UK Gas Transmission directorate, are responsible for investigating the causes of and reporting upon UAG.

National Transmission System Unaccounted for Gas Trends

This section of the UAG report provides information on assessed UAG quantities since April 2013, with particular emphasis on the period September 2019 to February 2020.

Formula Years 2013/14 to 2019/20

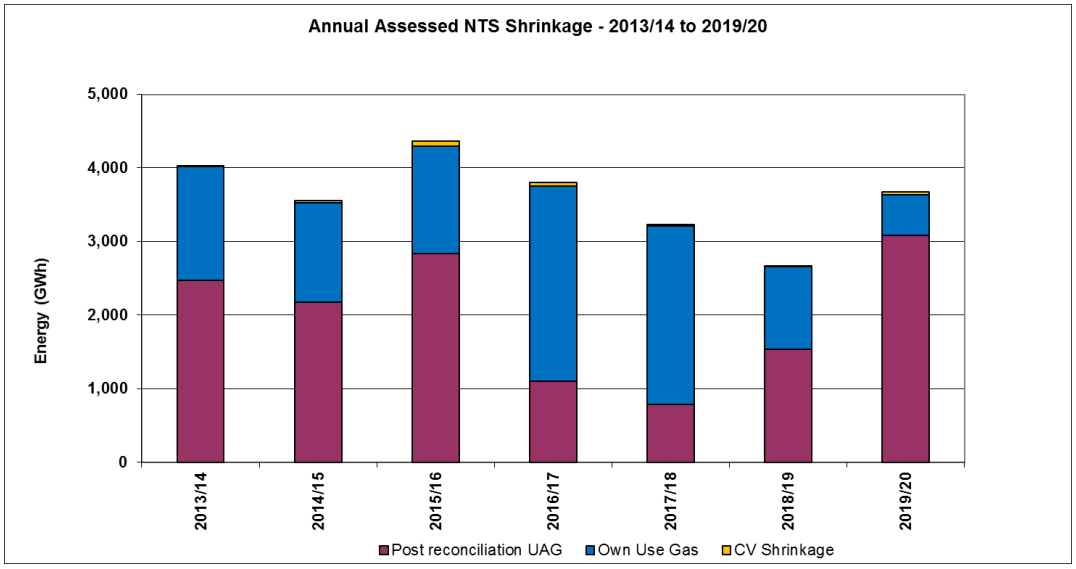

Figure 1: Annual assessed NTS Shrinkage – 2013/14 to 2019/20

Figure 1 provides the annual post-reconciliation UAG, OUG and CVS quantities for Formula Years 2013/14 to 2019/20. A Formula Year refers to the period from 1st April to 31st March of the following year. The quantities provided in Figure 1 for 2019/20 cover the eleven-month period from 1st April 2019 to 29th February 2020.

Figure 1 demonstrates that the current Formula Year's assessed NTS shrinkage for 2019/20 is currently expected to be greater than that observed in 2018/19 and is likely to be similar to levels observed in 2013/14. The 2019/20 levels of UAG are approximately double those in formula year 2018-19.

Assessed UAG for the current Formula Year already exceeds all the levels observed since the start of the RIIO T-1 price control period and is expected to rise further by the close of the 2019/20 formula year. The figure for 2019/20 also indicates that UAG is expected to be the predominant element of NTS Shrinkage, it currently accounts for 84% of total Shrinkage, much like 2013/14, 2014/15, 2015/16 and 2018/19 whereas for 2016/17 and 2017/18 OUG was the predominant element. The decrease in OUG has been driven by a large drop in the supplies at the St Fergus terminal, as Liquefied Natural Gas (LNG) supplies increased.

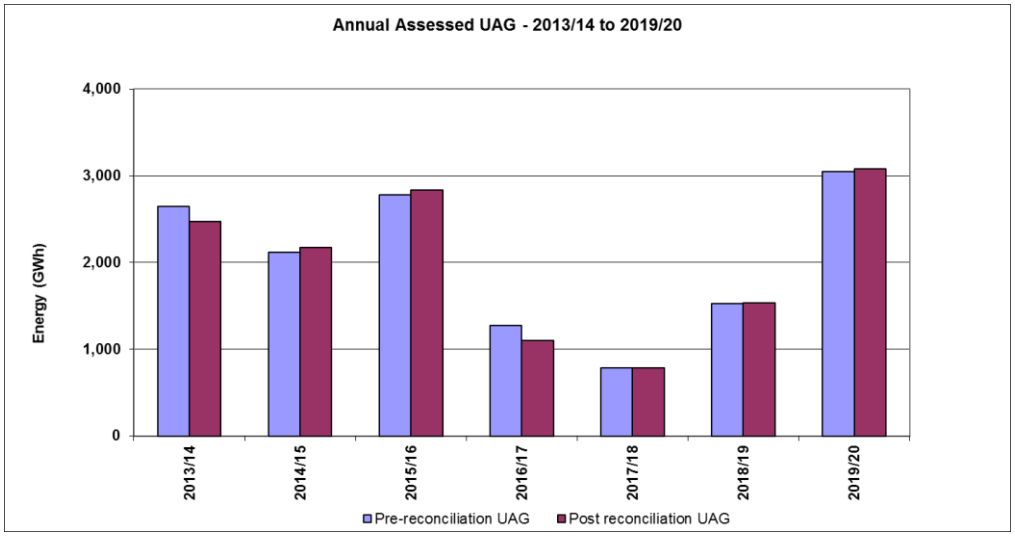

Figure 2: Annual assessed UAG – 2013/14 to 2019/20

Figure 2 provides the annual assessed quantities of UAG for Formula Years 2013/14 to 2019/20. As with Figure 1, the quantities provided for 2019/20 cover the period from 1st April 2019 to 29th February 2020.

The above figure represents both pre-reconciliation and post-reconciliation annual assessed UAG quantities. Pre-reconciliation UAG is calculated using the energy measurements reported in the Gemini commercial system at closeout for NTS entry and exit points. If a meter or data error is identified following closeout for one of these points, the correct measurements are determined. Post-reconciliation UAG is then calculated using the corrected measurements. Further information on reconciliation is provided in the UAG Management Activities section of this report.

As described in previous reports, a year on year reduction in annual assessed UAG was observed up to 2018/19 (with the exception of 2015/16). Assessed UAG since 2017/18 now appears to be increasing and UAG levels over the past six months has continued to rise. At the start of the six-month reporting period, assessed UAG followed a similar pattern to previous formula years. However, since October 2019 an increase in the magnitude and frequency of high positive UAG days has been observed. The UAG levels in November and December 2019 have been the highest observed since the start of the RIIO-T1 price control period.

Figure 2 indicates that for the majority of the years during the 2013/14 to 2019/20 period, annual post-reconciliation UAG quantities have been greater than the annual pre-reconciliation quantities for the same year.

Unless stated otherwise the remainder of this report will refer to assessed post-reconciliation UAG.

Table 1 provides the annual and daily average assessed UAG quantities for Formula Years 2013/14 to 2019/20. The table also provides the annual assessed UAG quantities as a percentage of annual NTS Throughput. The quantities provided for 2019/20 cover the period from 1st April 2019 to 29th February 2020.

UAG Statistics	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Annual Assessed Level (GWh)	2,472	2,173	2,838	1,103	784	1,531	3,081
Assessed Daily Average (GWh/d)	6.77	5.95	7.75	3.02	2.15	4.19	8.42
Annual Assessed NTS Throughput (GWh)	886,243	894,656	921,075	958,113	986,310	898,366	833,030
Percentage of NTS Throughput	0.28	0.24	0.31	0.12	0.08	0.17	0.37

Table 1: Statistical performance of UAG - 2013/14 to 2019/20

Table 1 indicates that the assessed daily average UAG quantity for 2019/20 is higher than that for the previous six years covered in the RIIO-T1 price control period. UAG as a percentage of annual NTS Throughput for 2019/20 is also expected to also be greater than the value observed in 2018/19.

Figure 3 provides the total monthly assessed UAG from April 2013 to February 2020. It also provides the average monthly assessed UAG for this period (168.44 GWh) together with the average monthly assessed UAG for the 2019/20 Formula Year (280.11 GWh).

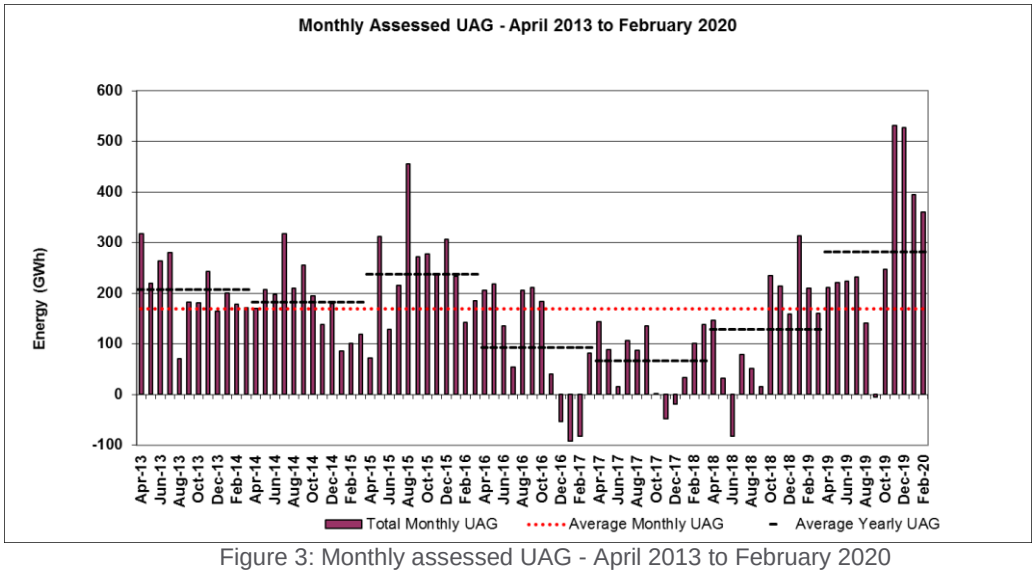

Figure 3: Monthly assessed UAG - April 2013 to February 2020

Figure 3 indicates, since the start of Formula Year 2019/20, monthly assessed UAG has been higher than the long term average in 9 out of the 11 months to date. The period between November 2016 and September 2018 is still of interest where 23 consecutive months were below the long term monthly average. UAG over both of these periods do not fit the normal trend of UAG behaviour. National Grid is investigating these behaviours and will provide a summary of our findings in future UAG reports.

Figure 4 provides the total monthly assessed UAG for September 2019 to February 2020 compared with the equivalent months of 2018/19. The figure indicates a different pattern of behaviour during the 2019/20 formula year specifically for September and the period between November and February to that observed during the same period in 2018/19.

National Grid have observed consistently higher positive levels of UAG over the last six months when comparing UAG levels to the same period in 2018/19.

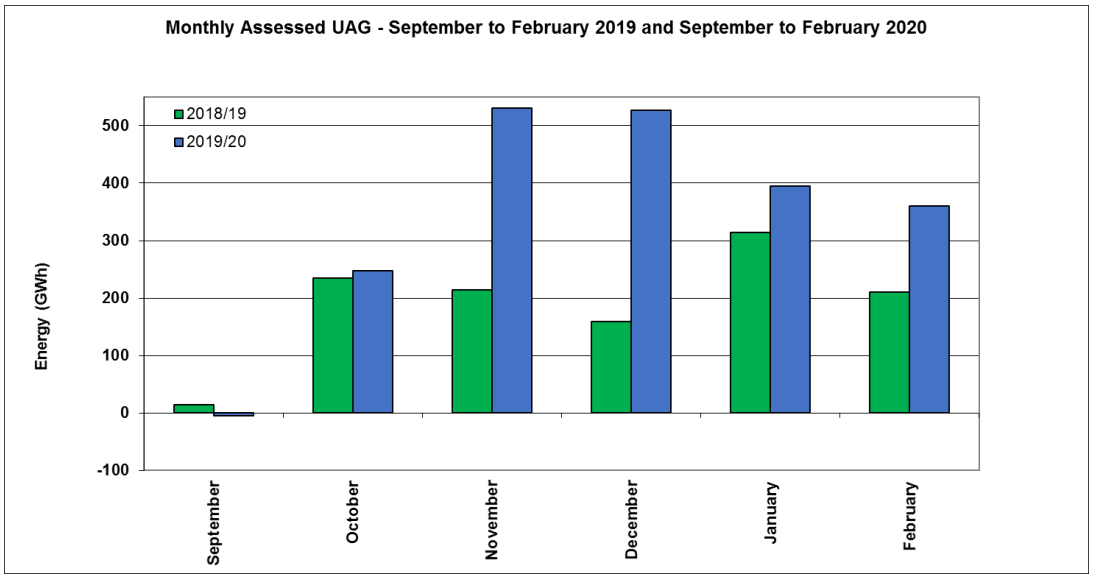

Figure 4: Monthly assessed UAG – September 2018 to February 2019 and September 2019 to February 2020

During the last six-months, the total monthly assessed UAG varied from -5.19 GWh to +530.50 GWh with a monthly average of 342.27 GWh. In comparison, during the September 2018 to February 2019 period total monthly assessed UAG varied from +14.60 GWh to +313.68 GWh with a monthly average of 190.94 GWh.

Figure 5 provides total monthly assessed UAG quantities between formula year 2013/14 to 2019/20. The values for 2019/20 cover the 11-month period between April 2019 and February 2020. The figure indicates that there is significant variance from one year to another, for example, December has a UAG spread of +526.61 GWh and -54.23 GWh. This indicates that there are no seasonal trends in assessed UAG.

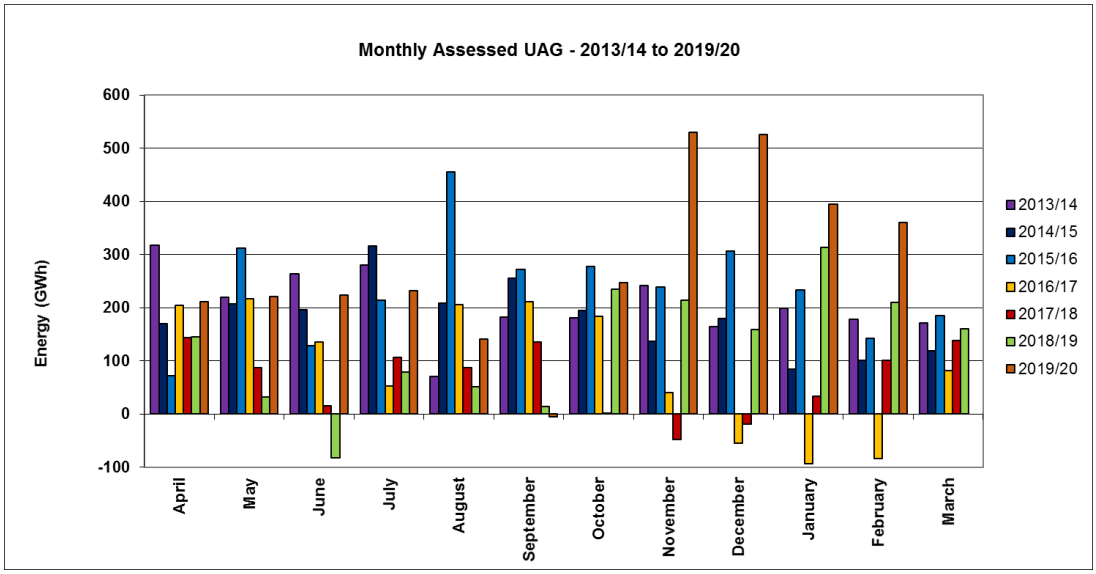

Figure 5: Monthly assessed UAG – 2013/14 to 2019/20

Figure 6 provides the daily assessed UAG values for September 2019 to February 2020 and indicates a step change in UAG behaviour since November 2019, with UAG showing predominantly higher positive values.

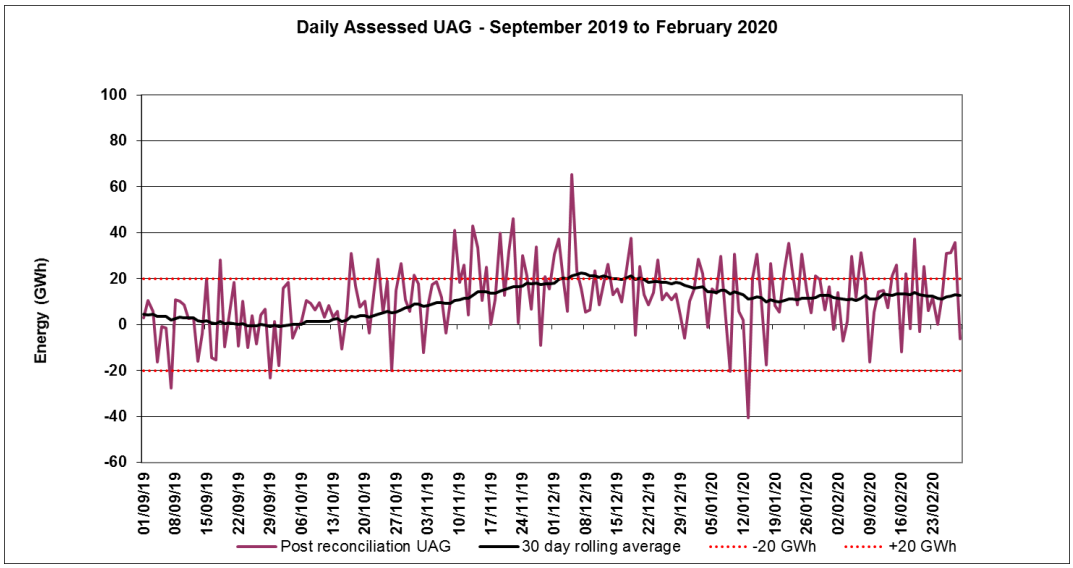

Figure 6: Daily Assessed UAG – September 2019 to February 2020

National Grid reviews and investigates the assessed UAG values on a daily basis paying particular attention to any values that exceed ±20 GWh. These baseline UAG quantities are provided as red dotted lines in Figure 6.

Over the past six months National Grid have observed 54 instances where UAG has exceeded ±20 GWh compared to 37 instances in the same period during the 2018/19 formula year, which is a 46% increase. National Grid have an established UAG investigation process which is followed for every instance where UAG exceeds ±20 GWh. This process has previously been successful in identifying data and input errors in the system but is less successful in identifying meter and system errors which consistently impact UAG. Considering this, we have set up a dedicated project team to tailor the high UAG investigation to this type of UAG behaviour. The first sprint of the UAG project is going to determine systematic data handling and measurement instrument changes on the network and provide detailed analysis of the NTS input and output flows over the last Formula Year. Details of this project can be found under the UAG Management Activities later in the report.

Over the past 24 months there have been an increase in the number of reconciliations caused by EU Nomination failures. These are typically due to file exchange failures between the Gemini system and the adjacent TSO which results in incorrect Allocations due to the Allocate as Nominate rule that is applied at the Interconnector Points. This can result in a significant commercial imbalance for the impacted parties and the Operational Balancing Account (OBA). National Grid have taken steps to develop a monitoring process between Gemini and the TSO's systems by working collaboratively with Gemini Application Support. The new monitoring process improves the team's ability to correct the EU Nomination within closeout (D+1) and process reconciliations for those that are not corrected. One example of a reconciliation that was identified was at Bacton BBL in February 2020 for 50.54 GWh.

National Grid continues to monitor NTS supply and demand patterns whilst investigating possible causes of UAG. Figures 7 and 8 below provide the monthly NTS supply and demand breakdown for the period April 2018 to February 2020.

Figure 7 below demonstrates a seasonal supply pattern which has been observed in pervious UAG reports. Over the last six months an increase in LNG supplies have been observed which has been coupled with a reduction in Interconnector Import when compared to the same period in 2018/19.

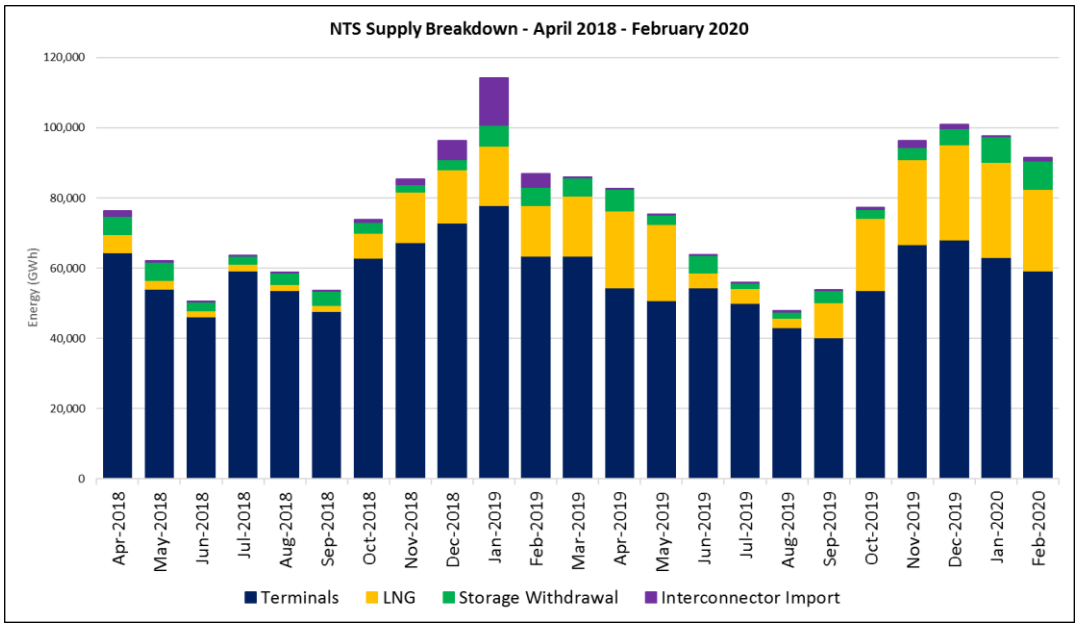

Figure 7: NTS supply breakdown – April 2018 to February 2020

Figure 8 below outlines demand patterns between April 2018 to February 2020. Gas Offtakes display a seasonal pattern and Industrial and Power Stations demand remains consistent throughout. Based on this, it is unlikely that the Industrial and Power Stations are causing the increase in UAG observed in the last six months.

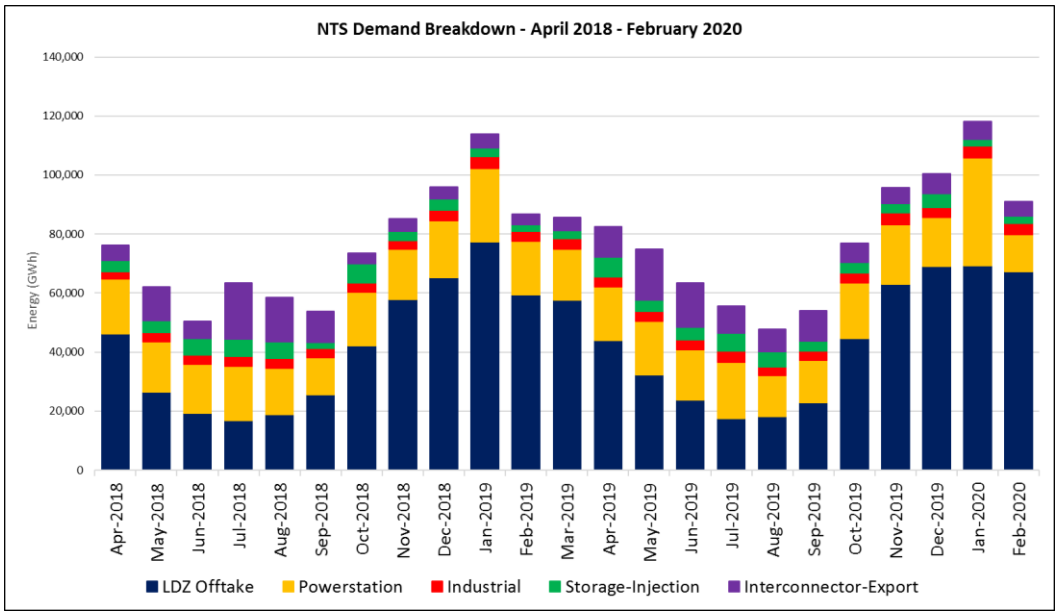

Figure 8: NTS demand breakdown – April 2018 to February 2020

Figure 9 below shows monthly LNG flows since April 2018 to February versus monthly assessed UAG, which is depicted by the red line. Between September 2019 and February 2020, it was observed that LNG deliveries to the NTS from Isle of Grain and Milford Haven LNG import facilities has significantly increased. Increased flows were also seen over this period in previous Formula Years. A correlation between LNG flows and UAG is still apparent, although analysis has not identified an error. National Grid are carrying out further analysis on the potential relationship between LNG flows and UAG which will be documented in future UAG reports.

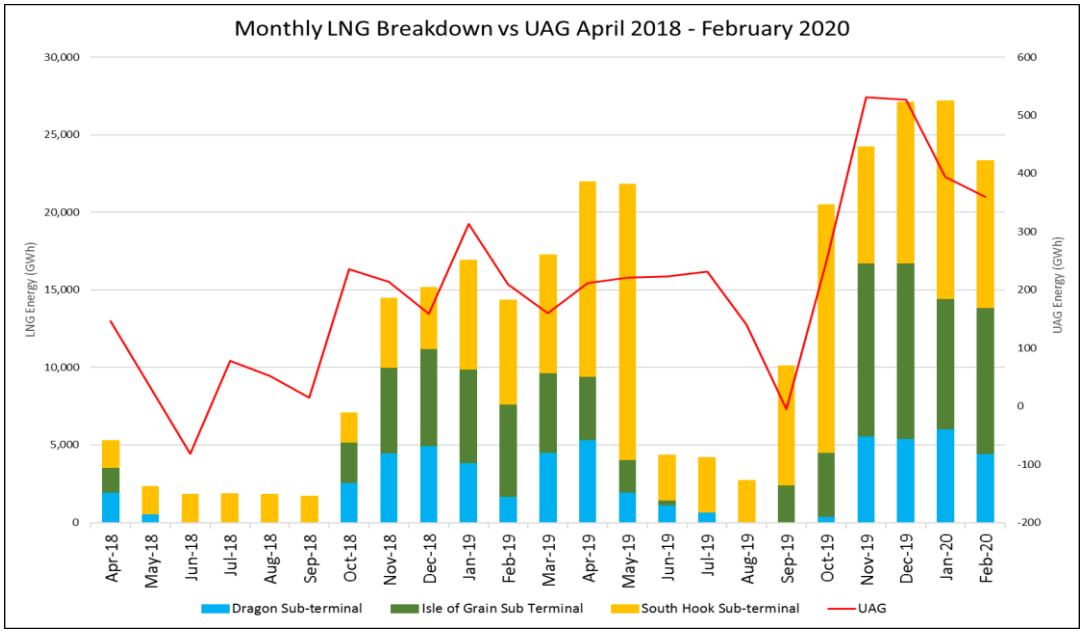

Figure 9: LNG Breakdown vs UAG – April 2018 to February 2020

National Grid have started to investigate the possible impact that CVs could have on the calculation of pre-reconciliation UAG. Pre-reconciliation UAG has been calculated in volume and compared to pre-reconciliation UAG in energy terms. Figure 10 below demonstrates the differences between pre-reconciliation UAG in volume and Energy.

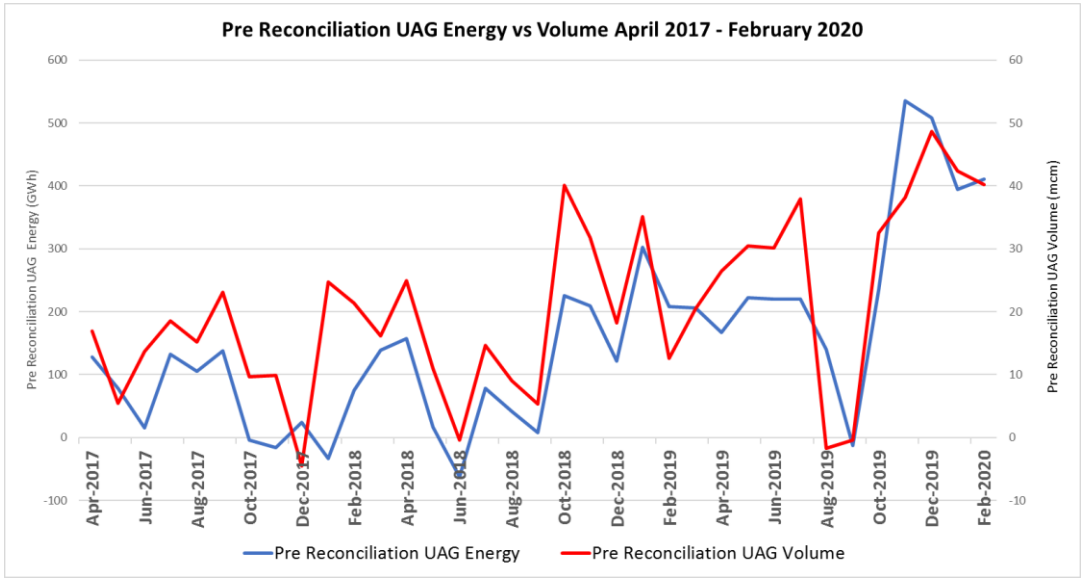

Figure 10: Pre Reconciliation UAG Energy vs Volume – April 2017 to February 2020

This analysis was conducted to identify errors across the period where the step change in UAG since October 2019 was observed. Differences can be observed throughout figure 10.

National Grid will continue investigating differences between pre-reconciliation UAG in energy and volume in the future.

UAG Management Activities

This section of the UAG report describes the various activities and initiatives that National Grid has been undertaking or is planning to undertake to investigate the causes of UAG.

Meter Validation Report Reviews

Meter owners are obliged to undertake meter validations for each of their metering installations on at least an annual basis to confirm that the metering equipment is functioning correctly. The results of these tests should be documented within a meter validation report and provided to National Grid.

The validation reports provide essential information that allows National Grid to assess the asset health and accuracy of the metering connected to its network. This enables a better understanding of the impact that meter error will have on assessed UAG.

For Formula Year 2019/20 National Grid has to date received meter validation reports for 86% of all the NTS entry and exit facilities. These reports are for validations that take place between April 2019 and March 2020.

The Meter Assurance team has reviewed the majority of the reports received and, where necessary, raised queries with meter owners. So far only two meter installations were assessed to have failed their meter validations. National Grid's liaison with these meter owners has confirmed that the meter error would be negligible to assessed UAG levels.

The Meter Assurance team will continue to request and review the remaining 2019/20 meter validation reports and use the data provided to assist with the identification of causes of UAG and to inform the preparation of future meter witnessing.

During meter validations, the meter installation equipment is interfered with by the personnel undertaking the testing. This may include making modifications to the metering system in order to simulate and record values which entails disconnecting physical instruments, wires and software. There is a risk that meter error could be introduced through these activities. National Grid is continuing to investigate the potential to identify assessed UAG when meter validations are known to be taking place.

National Grid is focussing on validation tests that have the potential to cause significant measurement error, to gain a better understanding of different calibration equipment and different tolerances. The asset owners are assisting with our queries associated to these tests.

Meter Witnessing

National Grid plans and undertakes an annual meter witnessing programme. This involves National Grid personnel attending metering installations throughout the UK during meter validations to observe and document the testing taking place. This is to gain assurance that the measurement equipment within the metering installation continues to measure the gas delivered to or taken from the NTS without bias and within the agreed measurement uncertainties
For Formula Year 2019/20 the annual meter witnessing programme comprises of 12 visits to a range of different metering installations. These installations have been selected based upon National Grid's assessment of the previous validation report or if the site has current measurement issues.

Out of the 12 witnessing visits, five have been completed, comprising three Power Stations, a LDZ Offtake and a large Industrial facility. On six occasions between April and November 2019 the asset owners have cancelled the scheduled witnessing visits due to other third-party audits occurring over the validation period or a change in the validation date. There was one instance where National Grid were unable to witness the meter validations due to internal resource requirements. The five-meter installations which were visited by National Grid were all observed to be measuring accurately.

Figure 11 provides a summary of the annual meter witnessing programme for 2019/20.

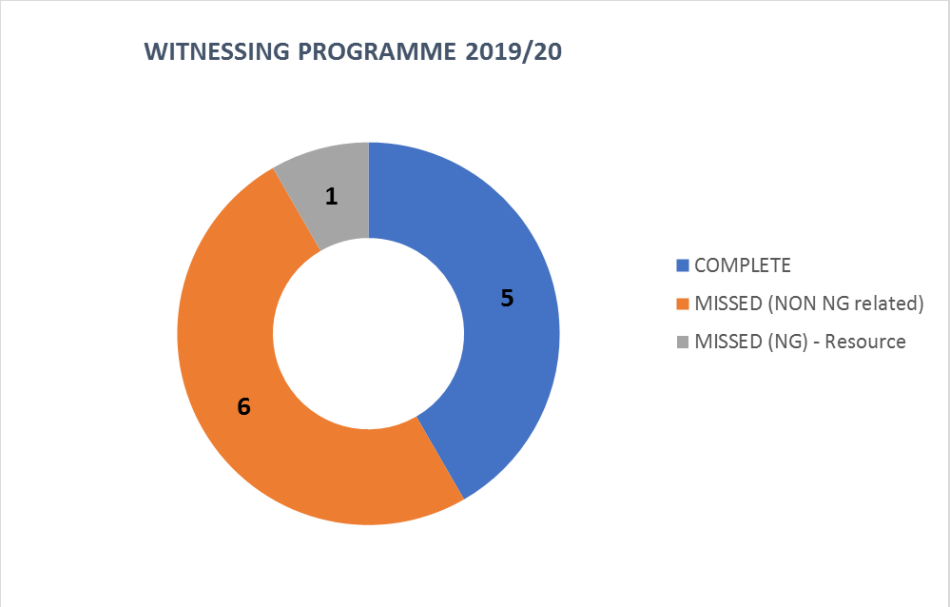

Figure 11: Meter witnessing programme for 2019/20

The 2019/20 witness programme is now complete. In the coming months National Grid will develop a 2020/21 witness schedule based on the validation results from this formula year.

Reconciliation

National Grid has an obligation to reconcile NTS related meter and data errors on behalf of the shipping community.

Over the past six months National Grid has processed 344.66 GWh of reconciliations in absolute energy terms. This comprises 124 separate gas days comprising of 39 separate reconciliation at individual NTS entry and exit facilities. The majority of these reconciliations concern days in Formula Year 2019/20, however, reconciliations have also been processed for 2016/17 and 2017/18.

Figure 12 provides the annual reconciliation quantities, in absolute energy terms, for 2013/14 to 2019/20. The 2019/20 section covers the period from April 2019 to February 2020. The orange coloured bars indicate the reconciliation quantities processed since the publication of the October 2019 UAG report.

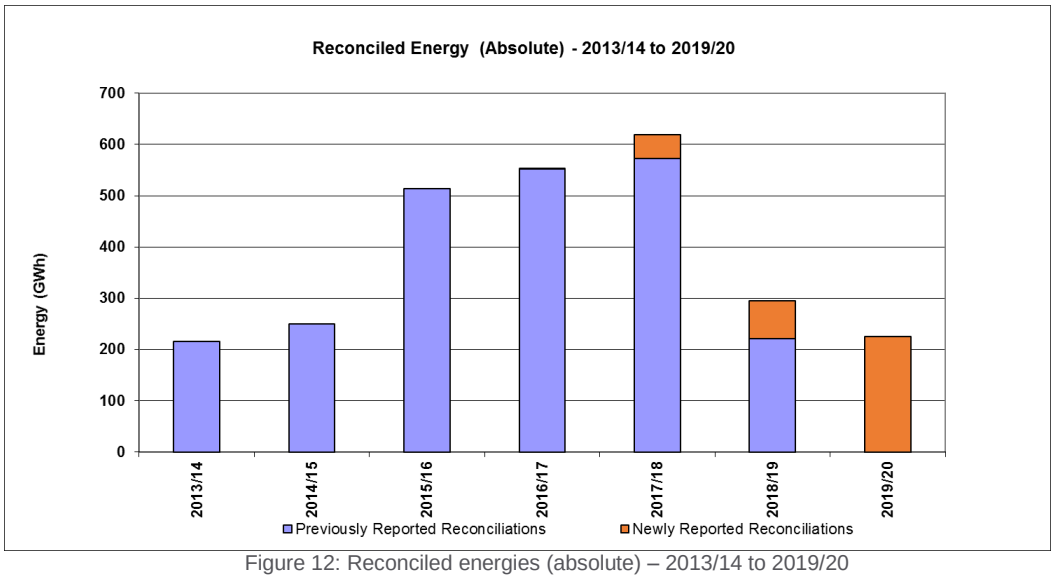

Figure 12: Reconciled energies (absolute) – 2013/14 to 2019/20

Of the 39 instances of reconciliation processed, four related to meter error (10% of instances) and 35 related to data error (90% of instances) 13 (37%) of which were caused by EU Nomination failures that were discussed earlier in the report.

National Grid is continuing to improve its validation of end of day measurements to help address data quality challenges experienced during the pre-closeout period. Testing for a new process that will automate the handling of measurement data has started, if successful this will be rolled out to the industry and will reduce data errors even further. Enhancements are also being made to tools that will help identify errors during the close out period.

National Grid is continuing to process meter or data error reconciliations which will be included in future Unaccounted for Gas reports.

Baseline UAG Analysis

An independent assessment of the baseline level of UAG, which could be expected from the network operating under normal measurement uncertainties, is being undertaken by Manchester University's mathematics department. A PhD student has been appointed under a National Grid sponsored ICASE (Industrial Cooperative Awards in Science and Technology) award to undertake this assessment. As discussed earlier in this report National Grid currently uses UAG baseline values of ±20 GWh as triggers to investigate potentially high levels of positive or negative UAG. This study is intended to provide a more dynamic UAG baseline quantity which will assist in the future management of UAG. It is also expected to provide a range of improved mathematical methods for identifying potential causes of UAG.

Over the last six months the PhD student has completed his final internship with National Grid, finalised an analytical application using Shiny and the R statistical computing package and developed an interactive user guide.

During the final internship the student also collaborated with National Grid's Data Scientists to discuss future investigation areas and techniques. These discussions have supported the development of Sprint 1 of the UAG Project (detailed below).

The student has written an academic paper which has been accepted by in Elsevier "Journal of Natural Gas Science and Engineering" and will be in the public domain in the coming months. Further details will be provided in a future UAG report.

Over the coming months he will be focusing on completing and submitting his PhD thesis for formal assessment and peer review.

Tableau Analysis

National Grid has been utilising Tableau software for some time now to visualise and analyse its data. Current Tableau dashboards are enabling to us to identify and minimise data errors within the closeout period.

Allocation data from the Gemini commercial system is now being adapted into our dashboards which gives National Grid the ability to compare and spot errors in a timelier manner. National Grid have created dashboards that can calculate UAG in volume which have been rolled out to the team. Further development to the data models has been carried out over the last six months which has improved the reliability of the data streams and efficiency of the processes associated to entering daily Measurements, CVs and Allocations.

Over the last six months National Grid has worked collaboratively with one of our adjacent TSO's to share data and techniques for managing UAG. National Grid demonstrated how they have utilised the Tableau system for live data visualisations to improve data analytics. Both National Grid and the adjacent TSO have planned to continue working together to try and improve our understanding and minimise UAG going forwards.

Global UAG Benchmarking

National Grid are participating in a global UAG benchmarking exercise which is being coordinated by the Italian Network Operator with the aim of bringing together techniques for managing UAG. The participating Networks will be able to share methodologies to gain insight into how UAG is managed in other countries.

UAG Project – Sprint 1

National Grid have launched a dedicated project team to investigate the increase of assessed UAG that has been observed over the last six months. The project is going to be managed in sprints to try and maximise the output from the allocated resource. The scope of sprint 1 is outlined below and covers the period from 1st October 2019 to 29th February 2020:

- Input and Output data analysis using R via National Grid Data Scientist
- Investigate the possible relationship between LNG flows and UAG
- Effectiveness of systematic data streams and handling
- Identify any metering upgrades / issues by reaching out to key NTS Entry and Exit points
- Review system updates to understand downstream impact

Once National Grid has completed all actions associated to Sprint 1, the intention is to increase the date range that will include the low levels of assessed UAG observed during November 2016 to September 2018. This period is considered to be outside the normal trends in UAG.

Conclusion

This report provides a review of National Grid's Unaccounted for Gas (UAG) management since April 2013, the start of the RIIO-T1 price control, with particular emphasis on 1st September 2019 to 29th February 2020 inclusive, the period since the publication of the October 2019 UAG report. It is published to meet National Grid Gas Plc (NTS) Gas Transporter Licence Special Condition 8E.

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It is expected that for Formula Year 2019/20 annual assessed UAG will be significantly greater than for 2018/19. Annual assessed UAG over the past six-month period was initially reflective of the 2016/17 period until months November and December where a significant increase in assessed UAG was observed.

National Grid continues to report post-reconciliation assessed UAG enabling a more accurate representation of UAG performance.

Continued support from meter owners has enabled National Grid to obtain and review meter validation information for NTS entry and exit facilities. This data is being used to support the identification of causes of UAG, to enhance National Grid's ability to detect meter error and to inform the preparation of future meter witnessing programmes.

A dedicated project team has been established to investigate the increase in assessed UAG levels that have been observed in the last six months. The project is still in its infancy and further updates will be provided in later UAG reports.

Appendix I - National Grid Gas Plc (NTS) Gas Transporter Licence Special Condition 8E

Special Condition 8E: Requirement to undertake UAG Projects to investigate the causes of Unaccounted for Gas (UAG)

Introduction

8E.1 The purpose of this condition is to set out the obligations of the Licensee in respect of undertaking projects for the purposes of investigating the causes of Unaccounted for Gas (UAG) and the publication of the findings of these projects, including relevant data.

Part A: Licensee's obligations under this condition

8E.2 The Licensee shall use reasonable endeavours to undertake the UAG Projects as specified in this condition for the purposes of investigating the causes of Unaccounted for Gas in respect of Formula Year t commencing on 1 April 2013 and each subsequent Formula Year t until 31 March 2021. The UAG Projects shall include but need not be limited to those set out in paragraph 8E.5. Where the Licensee does not undertake certain UAG Projects it shall clearly set out its reasoning in the UAG Reports referred to in paragraph 8E.3.

8E.3 The Licensee shall publish UAG Reports of the findings of these UAG Projects on its website and provide a copy of the UAG Reports to the Authority. The Licensee shall publish the UAG Reports by 1 May 2013, 1 October 2013 and every subsequent six months thereafter or such other dates as agreed by the Authority.

8E.4 Within one month of publishing a UAG Report the Licensee shall publish on its website all the relevant data referred to in the UAG Report. Where there are legitimate reasons for not publishing certain data on the website the Authority may consent for the Licensee not to do so.

Part B: Interpretation

8E.5 For the purposes of this condition:

UAG Projects
means the projects currently undertaken by the Licensee including:
(a) the witnessing by the Licensee of the validation of Measurement Equipment at NTS System Entry Points or Supply Meter Installations at NTS Exit Points; and
(b) investigation and analysis of data in order to seek to identify causes of UAG.

UAG Report
means the report of the findings of the UAG Projects undertaken by the Licensee. The UAG Report shall detail the UAG Projects the Licensee has undertaken in the previous period, the UAG Projects it proposes to undertake in the next period and the Licensee's views on whether, and if so how, the findings of the UAG Projects may be taken forward in order to reduce the volume of UAG. The UAG Report shall also detail the reasons why any UAG Projects that the Licensee proposed to undertake have not been undertaken. The UAG Report shall summarise any relevant discussion concerning UAG at industry fora and with interested parties on a one-to-one basis.

Unaccounted for Gas (UAG)
means the amount of gas (GWh) that remains unaccounted for after the Entry Close-out Date following the assessment of NTS Shrinkage performed in accordance with the network code.

Measurement Equipment; NTS System Entry Points; Supply Meter Installations; NTS Exit Points; Entry Close-out Date; NTS Shrinkage
shall bear the same meanings as are given to those terms in the network code.

Appendix II - Relevant data referred to in October 2019 Unaccounted for Gas Report

This appendix provides the relevant data used to prepare the figures and tables provided in the report. The assessed UAG, OUG and CVS values used in the figures and tables are calculated from daily assessed values published on the National Grid website.

Figure 1:

Formula Year	Annual post-reconciliation assessed Unaccounted for Gas (GWh)	Annual assessed Own Use Gas (GWh)	Annual assessed CV Shrinkage (GWh)
2013/14	2,472	1,548	6
2014/15	2,173	1,358	27
2015/16	2,838	1,458	71
2016/17	1,103	2,650	51
2017/18	784	2,427	23
2018/19	1,531	1,127	15
2019/20	3,081	556	42

The annual assessed values for 2019/20 cover the period from 1st April 2019 to 29th February 2020.

Figure 2:

Formula Year	Annual pre-reconciliation assessed Unaccounted for Gas (GWh)	Annual post-reconciliation assessed Unaccounted for Gas (GWh)
2013/14	2,648	2,472
2014/15	2,121	2,173
2015/16	2,782	2,838
2016/17	1,272	1,103
2017/18	783	784
2018/19	1,528	1,531
2019/20	3,045	3,081

The annual assessed values for 2019/20 cover the period from 1st April 2019 to 29th February 2020.

Figure 3:

Month	Monthly post-Reconciliation assessed Unaccounted for Gas (GWh)	Long-term average Monthly post-reconciliation assessed Unaccounted for Gas (GWh)	Average monthly post-reconciliation assessed Unaccounted for Gas for Formula Year (GWh)
Apr-13	317.44	168.44	205.96
May-13	219.73	168.44	205.96
Jun-13	263.95	168.44	205.96
Jul-13	280.72	168.44	205.96
Aug-13	70.32	168.44	205.96
Sep-13	182.42	168.44	205.96
Oct-13	181.28	168.44	205.96
Nov-13	242.19	168.44	205.96
Dec-13	164.73	168.44	205.96
Jan-14	199.55	168.44	205.96
Feb-14	178.06	168.44	205.96
Mar-14	171.13	168.44	205.96
Apr-14	170.10	168.44	181.05
May-14	206.87	168.44	181.05
Jun-14	196.66	168.44	181.05
Jul-14	316.85	168.44	181.05
Aug-14	209.14	168.44	181.05
Sep-14	255.07	168.44	181.05
Oct-14	195.17	168.44	181.05
Nov-14	137.43	168.44	181.05
Dec-14	180.02	168.44	181.05
Jan-15	85.04	168.44	181.05
Feb-15	101.03	168.44	181.05
Mar-15	119.23	168.44	181.05
Apr-15	72.17	168.44	236.48
May-15	312.16	168.44	236.48
Jun-15	128.85	168.44	236.48
Jul-15	214.60	168.44	236.48
Aug-15	455.12	168.44	236.48
Sep-15	271.54	168.44	236.48
Oct-15	277.74	168.44	236.48
Nov-15	238.92	168.44	236.48

Dec-15	306.21	168.44	236.48
Jan-16	233.55	168.44	236.48
Feb-16	141.95	168.44	236.48
Mar-16	184.97	168.44	236.48
Apr-16	205.08	168.44	91.89
May-16	217.46	168.44	91.89
Jun-16	135.27	168.44	91.89
Jul-16	53.27	168.44	91.89
Aug-16	205.62	168.44	91.89
Sep-16	210.84	168.44	91.89
Oct-16	183.72	168.44	91.89
Nov-16	40.17	168.44	91.89
Dec-16	-54.23	168.44	91.89
Jan-17	-92.83	168.44	91.89
Feb-17	-83.14	168.44	91.89
Mar-17	81.41	168.44	91.89
Apr-17	143.65	168.44	65.30
May-17	87.73	168.44	65.30
Jun-17	15.41	168.44	65.30
Jul-17	106.47	168.44	65.30
Aug-17	87.55	168.44	65.30
Sep-17	135.90	168.44	65.30
Oct-17	0.65	168.44	65.30
Nov-17	-47.64	168.44	65.30
Dec-17	-19.32	168.44	65.30
Jan-18	33.41	168.44	65.30
Feb-18	101.15	168.44	65.30
Mar-18	138.66	168.44	65.30
Apr-18	145.85	168.44	127.59
May-18	32.01	168.44	127.59
Jun-18	-82.26	168.44	127.59
Jul-18	78.40	168.44	127.59
Aug-18	51.71	168.44	127.59
Sep-18	14.60	168.44	127.59
Oct-18	235.10	168.44	127.59
Nov-18	213.74	168.44	127.59
Dec-18	158.75	168.44	127.59
Jan-19	313.68	168.44	127.59
Feb-19	209.77	168.44	127.59

Mar-19	159.74	168.44	127.59
Apr-19	211.24	168.44	280.11
May-19	220.65	168.44	280.11
Jun-19	223.51	168.44	280.11
Jul-19	231.66	168.44	280.11
Aug-19	140.51	168.44	280.11
Sep-19	-5.19	168.44	280.11
Oct-19	247.54	168.44	280.11
Nov-19	530.50	168.44	280.11
Dec-19	526.61	168.44	280.11
Jan-20	394.37	168.44	280.11
Feb-20	359.80	168.44	280.11

Figure 4:

Month	Monthly post-reconciliation assessed Unaccounted for Gas (GWh)	Month	Monthly post-reconciliation assessed Unaccounted for Gas (GWh)
Sep-18	14.60	Sep-19	-5.19
Oct-18	235.10	Oct-19	247.54
Nov-18	213.74	Nov-19	530.50
Dec-18	158.75	Dec-19	526.61
Jan-19	313.68	Jan-20	394.37
Feb-19	209.77	Feb-20	359.80

Figure 5:

Month	Monthly post-reconciliation assessed Unaccounted for Gas (GWh)
Apr-13	317.44
May-13	219.73
Jun-13	263.95
Jul-13	280.72

Aug-13	70.32
Sep-13	182.42
Oct-13	181.28
Nov-13	242.19
Dec-13	164.73
Jan-14	199.55
Feb-14	178.06
Mar-14	171.13
Apr-14	170.10
May-14	206.87
Jun-14	196.66
Jul-14	316.85
Aug-14	209.14
Sep-14	255.07
Oct-14	195.17
Nov-14	137.43
Dec-14	180.02
Jan-15	85.04
Feb-15	101.03
Mar-15	119.23
Apr-15	72.17
May-15	312.16
Jun-15	128.85
Jul-15	214.60
Aug-15	455.12
Sep-15	271.54
Oct-15	277.74
Nov-15	238.92
Dec-15	306.21
Jan-16	233.55
Feb-16	141.95

Mar-16	184.97
Apr-16	205.08
May-16	217.46
Jun-16	135.27
Jul-16	53.27
Aug-16	205.62
Sep-16	210.84
Oct-16	183.72
Nov-16	40.17
Dec-16	-54.23
Jan-17	-92.83
Feb-17	-83.14
Mar-17	81.41
Apr-17	143.65
May-17	87.73
Jun-17	15.41
Jul-17	106.47
Aug-17	87.55
Sep-17	135.90
Oct-17	0.65
Nov-17	-47.64
Dec-17	-19.32
Jan-18	33.41
Feb-18	101.15
Mar-18	138.66
Apr-18	145.85
May-18	32.01
Jun-18	-82.26
Jul-18	78.40
Aug-18	51.71
Sep-18	14.60

Oct-18	235.10
Nov-18	213.74
Dec-18	158.75
Jan-19	313.68
Feb-19	209.77
Mar-19	159.74
Apr-19	211.24
May-19	220.65
Jun-19	223.51
Jul-19	231.66
Aug-19	140.51
Sep-19	-5.19
Oct-19	247.54
Nov-19	530.50
Dec-19	526.61
Jan-20	394.37
Feb-20	359.80

Figures 6 to 9:

Daily actual energy values for the NTS entry and exit points are published on the National Grid website via the following link: https://www.nationalgridgas.com/data-and-operations/transmission-operational-data.

Daily assessed UAG values are published on the National Grid website via the following link: https://www.nationalgridgas.com/balancing/unaccounted-gas-uag.

Figure 10:

Month	Monthly pre-reconciliation assessed Unaccounted for Gas (GWh)	Monthly assessed Unaccounted for Gas (mcm)
Apr-17	127.90	16.89548
May-17	78.61	5.39619
Jun-17	15.36	13.65248
Jul-17	132.28	18.56355

Aug-17	105.24	15.22412
Sep-17	137.78	23.08334
Oct-17	-4.39	9.71868
Nov-17	-16.22	9.87562
Dec-17	24.17	-4.56734
Jan-18	-32.82	24.76590
Feb-18	75.37	21.39994
Mar-18	139.41	16.13555
Apr-18	157.42	24.91393
May-18	16.13	10.93460
Jun-18	-62.70	-0.35767
Jul-18	77.82	14.68546
Aug-18	41.17	8.97495
Sep-18	7.51	5.29335
Oct-18	225.98	40.06445
Nov-18	209.34	31.79837
Dec-18	122.01	18.16912
Jan-19	302.55	35.10747
Feb-19	208.22	12.61892
Mar-19	205.98	20.49228
Apr-19	167.06	26.43542
May-19	221.78	30.42147
Jun-19	220.41	30.16367
Jul-19	219.74	37.95975
Aug-19	140.51	-1.74802
Sep-19	-12.60	-0.43963
Oct-19	234.26	32.52091
Nov-19	535.14	38.13639
Dec-19	507.83	48.60053
Jan-20	394.37	42.36878
Feb-20	410.34	40.25508

Figure 11:

Criteria	2019/20 Meter Witnessing Programme
Completed	5
Not attended (meter owner related)	6
Not attended (National Grid related)	1
Future visit (dates confirmed)	0

Figure 12:

Formula Year	Number of instances of reconciliation published in October 2019 UAG report	Reconciled energy (absolute) published in October 2019 UAG report (GWh)	Number of instances of reconciliation processed since publication of October 2019 UAG report	Reconciled energy (absolute) processed since publication of October 2019 UAG Report (GWh)
2013/14	45	216.49	0	0
2014/15	47	250.71	0	0
2015/16	63	513.72	0	0
2016/17	127	552.32	2	1.02
2017/18	59	573.16	4	45.72
2018/19	31	221.72	12	71.05
2019/20	1	0.09	22	224.87

The reconciliation values for 2019/20 cover the period from 1st April 2019 to 29th February 2020.

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