2022 Exit Capacity Assessment Methodology Statement

Version 1.0

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nationalgrid

Contents

Confidentiality

In order to maintain the confidentiality of the data provided to NGGT by the GDNs', NGGT will anonymise or redact any data as per the GDNs' request. NGGT will also take necessary measures to comply with any confidentially agreements made with the GDNs.

1. Introduction

As per the Exit Capacity Planning Guidance (ECPG) section 3.18, this document outlines National Grid Gas Transmission's (NGGT) methodology used for the assessment of information provided by the Gas Distribution Networks (GDNs) in respect to future exit capacity (Flat and Flex) and assured offtake pressure (AOP) requests.

The assessment is undertaken using network analysis tools and techniques, as described in section 6 of the Transmission Planning Code (TPC).

High Level Process Overview:

- NGGT create a range of scenarios to assess current network capability with regard to capacity bookings and assured offtake pressures. The scenarios use both GDN requests, which reflects their view of peak 1 in 20 demand, and Future Energy Scenarios (FES), which is the process published by the Electricity System Operator (ESO) and used by NGGT in its Network Capability process.
- NGGT analyse the scenarios to assess any change in the level of risk or cost on the network in meeting the GDNs' proposed Flat, Flex, and AOP.
- NGGT liaise with GDNs to discuss where capacity/AOPs requests can or cannot be allocated, and discuss potential combinations which will be able to satisfy both parties and maintain the level of cost and risk[1] on the network.
- GDNs, where necessary, submit a revised proposal for Flat, Flex and AOPs.
- NGGT analyse the scenarios with any updated proposals from the GDNs'.
- NGGT confirm allocations of GDNs' capacity and pressures.

2. Scenario Development

In order to assess what Exit capacity can be released, it is necessary to define a "peak 1 in 20 scenario" in terms of both supply and demand patterns. As per UNC definition, the 1-in-20 peak aggregate daily demand is the level of daily demand that, in a long series of winters, with connected load held at the levels appropriate to the winter in question, would be exceeded in one out of twenty winters, with each winter counted only once. Requirement to meet this demand is the security standard as set out in National Grid's Gas Transporter Licence with respect to Standard Special Condition A9[2]: Pipe-Line System Security Standards.

The peak 1 in 20 demand information is published in the Gas Ten Year Statement (GTYS) and the Winter Outlook documents.

The scenario formulation starts with the diversified[3] peak 1 in 20 forecast (the Base Case scenario). This is modified with GDNs supplied information, from the offtake capacity statements (OCS), to create the base case scenario. From the base case, regional demand and local supplies are altered to create a Regional Sensitivity scenario.

The following subsections describe the formulation of these two scenarios.

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[1] Where there is enduring incremental capacity above physical capability of the network, as identified by the Network Capability process, cost benefit analysis (CBA) may be carried out to identify the most economical solution.

[2] Refer to the Gas Transmission Planning Code for a fuller description of the peak 1 in 20 demand

[3] The diversified total peak day demand forecast is the national gas demand, assuming no interruption, expected in 1 in 20 cold weather conditions. Diversified peak day is used where location is not important. Refer to the Gas Demand Forecasting Methodology for more detail.

2.1 Base Case Scenario

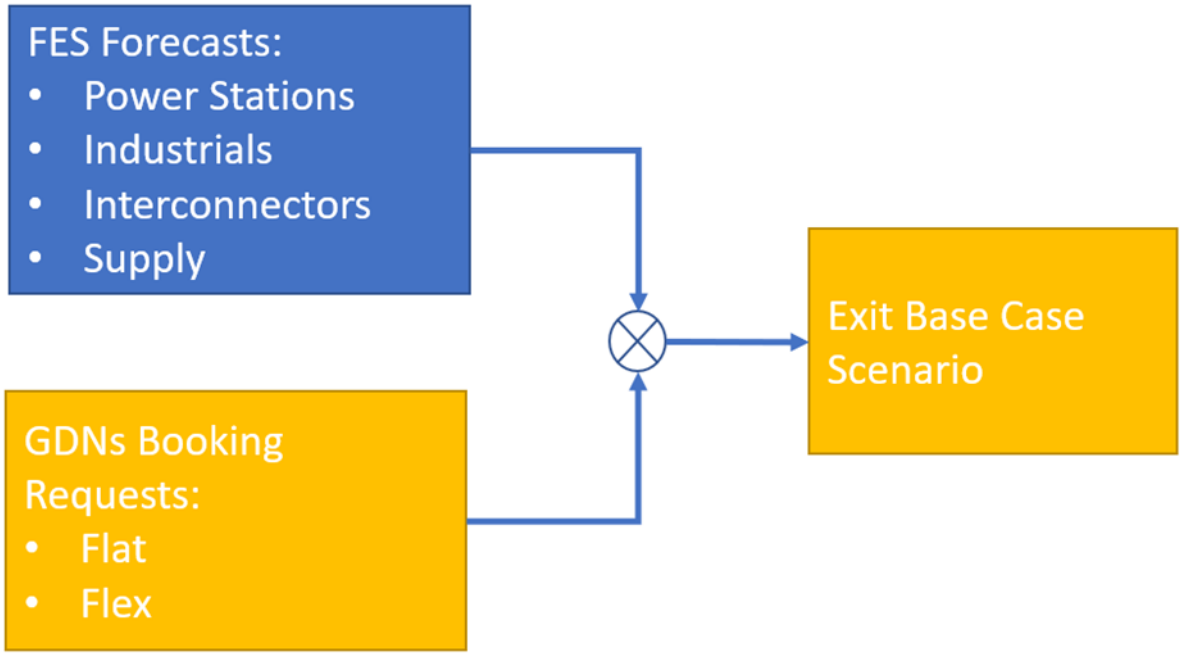

Figure 1

Base case scenarios provide the demand and supply input to network analysis as a starting point. They are created to allow us to analyse the GDNs view of LDZ 1 in 20 demand, alongside the FES 1 in 20 demand and supply pattern day. Figure 1 depicts the formulation of the base case scenario.

Up to six base case scenarios, reflecting each year of the six year Exit Capacity Allocation planning horizon, can be created. These base cases reflect the current exit capacity allocations. They provide a benchmark to which all requests can be compared, in order to assess the physical effects, and impact on commercial risk, of the new requests.

2.1.1 Scenario Inputs

FES data

FES is a document published annually by National Grid ESO. FES describes what the future of energy supply and demand may look like. NGGT procures from the ESO data produced from FES outputs, which forms part of what is used to predict supply and demand capability patterns for future years.

For Exit Capacity allocation the plausible highest demand scenario from FES is used for all analysis.

FES outlines what a peak (1 in 20) supply and demand breakdown is for each year and each scenario. This includes predicted flows from Storage sites and Interconnectors, supply levels from Terminals, and demand flows for each directly connected (DC) load and Local Distribution Zone (LDZ).

DN Forecasts (OCS) Booking

The Offtake Capacity Statement (OCS) outlines the Flat and Flex capacity requirements at each exit point. These bookings should reflect the amount of capacity required to maintain supplies under the GDNs' 1 in 20 forecasts.

Other Sources

Historical operational data is also used as part of the exit analysis.

2.1.2 Building the Scenarios

Demand

For GDNs' demand figures we do not use the flows from FES, as the GDNs' have already booked capacity in order to supply their individually predicted 1 in 20 scenarios, having that capacity booked means that National Grid is obligated to deliver this gas if required. Therefore for the exit process GDN demand is adjusted to reflect the OCS. As the OCS contains both flat and Flex capacity figures it is possible to create a profile for likely demand for the GDN offtakes.

Supply

The initial supply figures are taken from the FES forecast, however due to the adjustments made to demand from the FES scenarios, supply must be adjusted in order to equal demand. This is done in a balancing order based on available supply to meet demand and its historic responsiveness to demand change. Interconnectors are as per FES, and assumed to be supplying to the system at high demand levels.

Within Day Flow Profiling Assumption

The approach for modelling within day behaviour are described in section 6 of the TPC. For Exit Capacity Allocation analysis, the GDNs' Flex bookings are used to reflect LDZ linepack usage, power stations are based on historical data. Supply is assumed to be flowing at a flat (1/24th) rate

Other assumptions

The level of linepack (stock) which the scenario starts at can be adjusted within the network simulation model (Simone). The level of linepack used is based on operational opening linepack targets which are based on previous operational experience.

Assumptions on gas quality and temperature are made as per TPC[4].

2.2 Regional Sensitivity

As well as the base case scenarios, sensitivity scenarios are created, for areas that are potentially constrained (currently the South East and South West). Sensitivities for other regions may also optionally be created if there are significant changes in the region.

Demand

Under a regional sensitivity scenario, LDZ demand is adjusted to undiversified[5] FES forecast, while DC load flow is adjusted to an assessed high flow level. This is currently 90% of the baseline based on historic data. The change in demand is balanced at the least interacting region (normally geographically furthest away), to maintain overall forecast NTS demand forecast level.

Supply

The supply point(s) which most affects the sensitivity region is reduced to minimum. For the South East this is Isle of Grain, while for the South West this is Milford Haven and the Humbly Grove storage. This is in line with our Network Capability assessment process.

When the flows from these ASEPs are reduced the flow has to be increased at another ASEP in order to balance the scenario. The supply is moved to the ASEP that is furthest away based on pipeline

[4] See section 6.20 of the TPC
[5] The peak day at every location added together.

distance (typically an ASEP which has the least influence on the region being analysed). Once an ASEP is at maximum flow (as defined by FES) or becomes a point of entry constraint, the next farthest ASEP is increased.

This process continues until either; supplies cannot be increased anywhere else without an entry constraint, all other ASEPS being increased are at maximum, the ASEP being decreased is at minimum or creates an exit constraint.

The minimum supply flow is determined by reviewing historical data.

All supply increases within a scenario are such that they are within the maximum FES forecasts, as published in GTYS and Winter Outlook documents.

3. Network Analysis / Assessment

Each scenario created is analysed and assessed to ensure that we can operate the system in an economic and efficient manner and deliver our obligations. In order for a scenario to be defined as resolved the following criteria must be met; it has to be within the lower (AOP and ANOPs) and upper (MOP) pressure limits[6] and the equipment (Compressors and valves) must be operating within design limits. Refer to section 6 of the TPC for a more detailed description of how analysis is carried out on the network model.

3.1 Making Allocation Decisions

Based on network analysis and alongside collaborative discussions with GDNs, the aim is to establish a positive outcome for both parties, without increasing risk or operational costs. This is especially true for Flex and AOP allocations.

3.1.1 NTS Exit (Flat) Capacity

NTS Exit (Flat) Capacity is capacity which a User is treated as utilising in offtaking gas from the NTS at a rate which (for a given Daily Quantity) is even over the course of a Day. The release of NTS Exit (Flat) Capacity is described in the Exit Capacity Release Methodology Statement.

Within Baseline

Each exit point has a capacity baseline[7], which is an amount of capacity that National Grid must make available. Any requests for Flat capacity within baseline are classed as non-incremental exit capacity and allocated.

Above Baseline

National Grid may make available NTS Exit (Flat) Capacity at NTS exit points in excess of the Obligated Exit Capacity (baseline).

Any capacity released above baseline will be Non-obligated Exit Capacity in Y+1, Y+2 and Y+3 if there is no enduring requirement. This capacity release only applies for the relevant gas year. If the increase in capacity is deemed as not substantially increasing National Grid's costs or to increase risk of a constraint (i.e. the likelihood of not meeting pressure obligations), and it is recommended for non-obligated[8] capacity release.

Any capacity allocated above baseline for Y+4, Y+5 and Y+6 is enduring capacity and, is therefore, retained by the DN from the allocation date onwards. National Grid can allocate this capacity through substitution (moving unsold capacity from other exit points). If substitution cannot be achieved, as set

[6] Refer to section 6.16 of the TPC
[7] For more information on capacity refer to the capacity methodology statements website
[8] non-obligated capacity sales are also carried out on the gas day by the control room, and are applicable only for that day.

out in the substitution methodology[9], then the PARCA[10] process will be recommended to determine the best way the capacity can be allocated.

3.1.2 NTS Exit (Flexibility) capacity

NTS Exit (Flexibility) capacity (Flex) is capacity which a DNO user is treated as utilising, in taking gas from the NTS to the extent that (for a given Daily Quantity) the rate of offtake or flow is not even over the course of a Day. This can be thought of as an amount of gas taken during the daytime (06:00 – 22:00) above the flat rate, over the night (22:00 – 06:00) the flow rate at the exit point reduces in order to make the end of day quantity the same as if the flat rate was taken all day.

National Grid will not release additional Flex Capacity (via the OCS process or by acceptance of an OPN[11]) where this would require investment or would, in the opinion of National Grid, result in an increase in operating costs. Hence any request for additional Flex will not be allocated where it:

- requires reinforcement of the NTS
- leads to an increase in costs
- could reasonably be considered to lead to a conflict with the safe operation of the network.

Flex is also an evergreen product, so future requirements that are within existing obligations must be taken into consideration when NGGT allocate Flex. In order to assess the Flex requests, a new scenario is created with the requested Flex figures input as the exit flows, the differences on the system are then compared to the base case and regional sensitivity cases (if applicable). A request will be accepted if it does not materially increase the risk of exit constraint. This is done by comparing the scenarios with the proposed increase against that without the increase and examining the difference in terms of meeting existing obligations.

3.1.3 Assured offtake pressures (AOP)

Each GDN requests AOPs for both 0600 and 2200 pressures at each offtake. Any reduction would typically be accepted as this is likely to reduce risk and cost for NGGT. Increases are assessed after the updated Flex and flat capacities. An AOP increase will be agreed if it does not materially increase the risk of a network constraint, increase costs, or limit operational flexibility. This is done by assessing if the increased AOP is met on the existing scenario configuration, or without significant increase in compression.

While network analysis may show that the network is capable of delivering an AOP request at high demand levels, NGGT also consider the historical pressures for the site as this can highlight where pressures may be kept lower for operational reasons such as efficiency. An example of where such a situation arises is in the South East where, at lower demand levels, pressure at offtakes are lowered significantly to accommodate high entry at Isle of Grain. However, at peak demand this need may not arise due to high demand supporting the high entry flows. Hence, although default AOPs are mainly requested for peak demands, they are applicable on all gas days, operational considerations for non-peak demand days are therefore also taken into account.

3.2 Constrained Regions

Certain regions are deemed to be constrained, i.e. areas difficult to maintain AOPs, typically South East and South West extremities. For these regions, minimum supply flow achieved in the regional sensitivity is also taken into consideration in making Flex release decisions.

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[9] See the Exit Capacity Substitution and Revision Methodology Statement
[10] Planning and Advanced Reservation of Capacity Agreement.
[11] Offtake Profile Notification

3.3 GDN discussion

As part of ECPG, analysis is not undertaken in isolation, regular discussions take place between NGGT and GDNs. This enables us to understand what the GDN is requesting and for us to outline where we are unable to allocate a request and then to discuss alternative options.

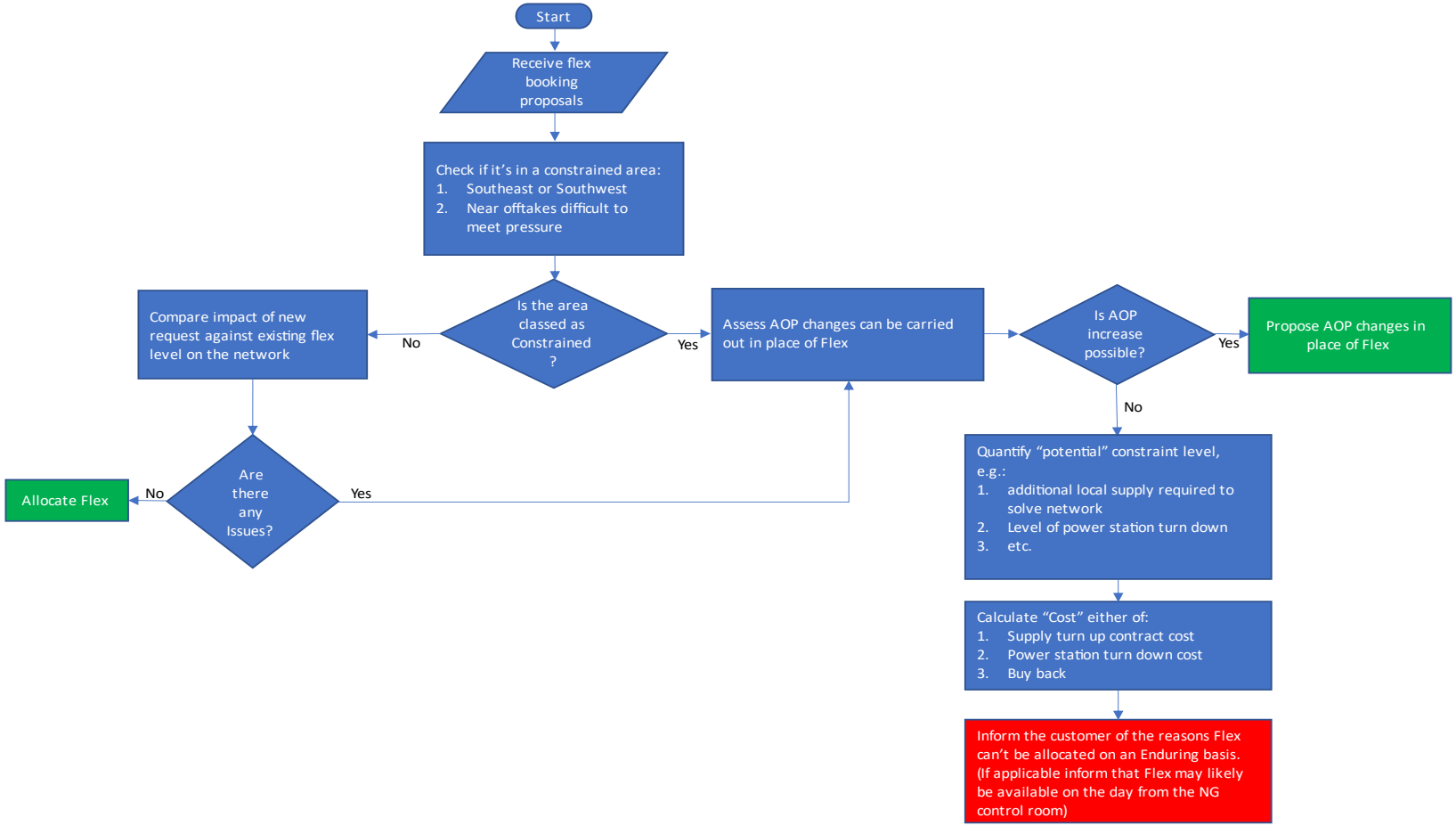
Discussions with GDNs are undertaken prior to closure of July application window, and throughout the assessment period between August and September. Prior to application window closure, GDNs' prospective bookings are discussed, including alternative booking scenarios. NGG gives feedback on the scenario, in terms of impact on the NTS. The information is used by NGGT to carry out some prior assessment work for non-obligation capacity releases, which have a shorter[12] turnaround.

During the assessment period, as each element of the exit bookings affect one another, options are explored with the GDNs which can include any combination of increasing or reducing Flat capacity, Flex capacity, 0600 AOP or 2200 AOP, at any combination of exit points. These discussions are undertaken in order to find an allocation which will satisfy both the GDNs and NGGT requirements/obligations wherever possible.

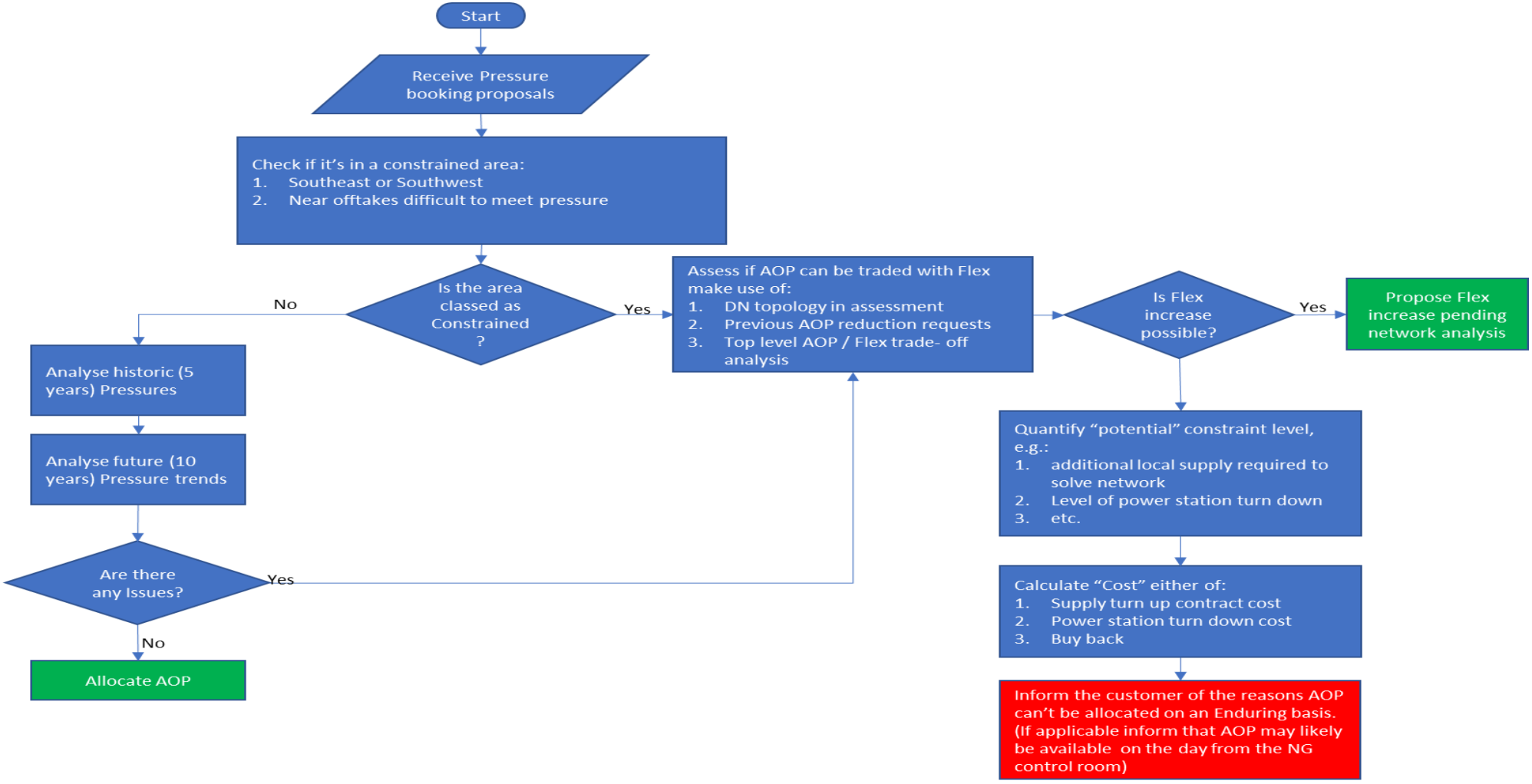
[12] Decision on Annual capacity has to be communicated within the first 10 working days after closure of July application window. Above baseline annual capacity may be released as non-obligated capacity.

Appendix

Appendix A : Making Flex Capacity Allocation Decision



Appendix B : Making AOP Allocation Decision



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