Black Start Allowed Revenue Report 2020/21

Executive summary

ESO incurred £66,232,017.45 of Black Start costs in respect of Relevant Year April 1st, 2020 to March 31st, 2021.

Background

National Grid Electricity System Operator Limited (NGESO) has produced this report in accordance with Special Condition 4G, Part E of its electricity transmission licence. Special Condition 4G.13 states that the licensee NGESO shall prepare a report in respect of total costs incurred in respect of Black Start in this Relevant Year 1st April 2020 to 31st March 2021.

This Black Start Allowed Revenue Report will set out how NGESO has;

1. Calculated the total costs incurred.
2. Validated the data used to determine the total costs.
3. Complied with the Black Start Strategy and Procurement Methodology when incurring the total costs.

This report was accompanied by a statement from an independent auditor confirming that the report is accurate detailing the auditor's independent assessment of the extent to which NGESO has complied with the Black Start Strategy and Procurement Methodology.

Author: Steve Miller – Senior Contracts Manager

1) Calculation of Total Costs[1]

The total costs incurred for the provision of Black Start for the Relevant Year 2020/21 is £66,232,017.45. There are a number of areas of costs associated to Black Start as identified in the Procurement Methodology, which can be categorised into the following elements. This section will explain how these costs are calculated.

Breakdown of Costs (£)	
Availability Payments	£43,443,510.83
Capital Investment	£18,769,546.57
Feasibility Studies	£1,327,663.00
Testing	£212,380.38
Warming	£2,478,916.67
Total	**£66,232,017.45**

1. **Availability Payments**: These are paid to the service provider to maintain capability throughout the year and offered as part of a tender or bilateral contract negotiation; the provider will proffer a fixed price to be paid annually, this is then worked out into a £/settlement period and paid monthly to the provider. Providers are only paid for settlement periods when they have declared they are available. There is a defined business procedure that NGESO follows to determine the monthly payment based on availability declarations received from the provider. The contract data including availability payment per settlement period and if necessary, any indexation data is taken from the signed Commercial Services Agreements between NGESO and the service provider and the monthly payment determined.
2. **Capital Investment:** New Black Start service providers are likely to require significant capital investment as outlined in the Procurement Methodology. This is typically agreed at the start of the contract and is either paid upfront before the service commences, smeared over the duration of the contract or at pre-agreed periods. Each contract will include a breakdown of costs including where necessary a milestone payment schedule. In either case payment is dependent upon the receipt of valid invoices, though sometimes invoices can be received a number of years after a service commences, in the case where the capital is for ongoing work.
3. **Feasibility Studies:** NGESO will ensure any costs incurred by service providers have been procured in an economic manner and as such would expect providers to tender for the work where possible with evidence to the extent where possible. The feasibility study costs are agreed in the commercial side letter between NGESO and the provider and we will only pay up to the agreed amount subject to valid invoices. For the agreements as part of the tenders for SW & Midlands and the Northern regions (Scotland, NE and NW), this cost has been capped at £150,000 per Feasibility Study 2.
4. **Testing**: In accordance with the Procurement Methodology, NGESO will work together with the provider to develop a strategy to test the unit at the most economic and efficient time, mitigating any distortion to the market and all providers will be tested at least every three years in accordance with the EU Code. Like the feasibility study costs, we agree the basis of payment in a commercial side letter and will only pay the agreed amount subject to valid invoices. Due to the COVID-19 Pandemic in 2020 we were not able to attend sites and therefore full grid code tests were limited relying on self-certification and other assurance activities.
5. **Warming Requirements**: Black Start providers must be able to respond in a specified time, (normally within two hours), to be deemed available for Black Start. If service providers of certain technology types have not generated for a period, the units may not be warm enough to meet that response time. In such circumstances, NGESO will assess the overall availability in the region, and may instruct a capable unit for warming to maintain the minimum service level. This is typically during summer months when demand is lower and contracted stations are on outage or out of merit. Spend on warming may be instructed through the Balancing Mechanism (BM), trades, or by forward contracting. The costs are calculated based on what has been agreed either through a forward's contract or in the case of a trade through a Schedule 7A or in the BM through a Bid-Offer price (BOA) and like availability payments, the cost is paid monthly. There are also occasions when we will move a Black Start providers outages to mitigate the need to warm a capable plant if economic and efficient to do so.

[1] All Ancillary Services costs are reported exclusive of VAT

The following table 1 demonstrates the total costs in respect of availability and warming since 2014/15.

Table 1

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Availability	£23,275,720	£18,886,830	£114,347,564	£35,392,352	£38,503,951	£40,330,496	£43,443,510
Warming	0	0	£3,987,200	£19,903,961	£5,710,374	£5,170,241	£2,478,916.

2) Validation of Total Costs

NGESO will ensure through a robust validation process that all reported costs are accurate for each cost element.

Availability Payments: Following the defined business procedure outlined in the calculation of costs, the settlements team will send a preliminary statement to the provider informing them how much they are expected to receive. The provider has a number of days to review before NGESO will send a final statement which forms the payment the provider will receive.

Capital Investment: This is paid upon the submission of valid invoices to NGESO and in accordance with the signed sanction papers and Commercial Service Agreements (CSA). The provider may incur these costs before recovering them from NGESO and they may be collated and submitted by the provider in pre-agreed periods prior to the service start or throughout the service term. Therefore, NGESO could receive invoices dated for the previous Relevant Year, which it may not have received until following Relevant Year. Once received, invoices are reviewed and validated against the agreed spend in the contract. This validation includes a review of the invoice against the contract or milestone schedule and the type of works to ensure it meets with our expectations. Only then will a Purchase Order be raised for payment.

Feasibility Studies: Similarly, to capital investment, the feasibility study costs are paid upon the receipt by NGESO of valid invoices in accordance with the signed sanction papers and feasibility study contracts with the service providers. NGESO will receive invoices from third parties if appropriate and a specific invoice from the provider listing all activities required for the study.

Testing: This is paid either through a negotiated fixed price or through a market mechanism for incumbent providers and NGESO and the provider will look at the most cost-effective solution for the test. For new providers who have been contracted through the Black Start tenders, the cost has been agreed as part of the availability fee and all liabilities will be on the provider. Any invoices received will again be validated against the commercial side letter as agreed between NGESO and the provider. In 2019/20 NGESO developed a cost reimbursement methodology that can be used for certain tests where the provider may be more exposed to market spreads again for the incumbent providers.

Warming Requirements: This is paid through the following methods.

- Payments made in the BM or through Trading on actions taken to warm Black Start capable plant to ensure we have enough service providers in a state of readiness. These payments are actuals and are carried out in real time and paid per settlement period.
- Short term warming contracts with a provider of Black Start to reduce the cost of trading in advance of taking actions in the BM. This will typically be in the form of a fixed price to run the station at agreed intervals to maintain warmth over the duration of the contract.
- Payments made to a provider of a Black Start capable plant as part of a contract to ensure that the plant will be available and running during the Relevant Year. Some providers have a warming contract within the Commercial Services Agreement to mitigate the risk of not running in the market and therefore not being in a state of readiness. In this case the payment will be paid as part of the availability payment and validated against the defined business procedure.

3) Compliance with the Black Start Strategy and Procurement Methodology

As the licensee, NGESO must also demonstrate how any new contracts including, renewals, warming contracts, testing and feasibility studies comply with the Black Start Strategy and Black Start Procurement Methodology approved by the Authority on the 10th May 2021. Many of the existing Black Start contracts were awarded prior to the publication of the methodologies and are therefore out of the scope of this audit, though the principles of the Black Start Strategy and Procurement Methodology were applied. This section will also provide an update on the competitive procurement of Black Start and is made up of three parts as follows:

a. Competitive Procurement
b. Contracts
    i. For service delivery in 2020/21
    ii. For service delivery from 2021/22 and 2021/22
c. Payments

3a) Competitive Procurement

On the back of the Expression of Interest (EOI) that was launched in Feb 2019 for services in the SW & Midlands we launched a second competitive event with an EOI in August 2019 for services in the Northern Region.

The SW & Midlands tender concluded in November 2020 and we awarded six contracts to successful providers who are now all working towards service delivery, some expected from Oct 2021, others from the summer of 2022. Many of the providers have incurred feasibility study costs, which will be part of the cost recovery for 2020/21 and some successful providers requested capital contributions as part of their submission that have incurred costs in this scheme year as outlined further in this report. In the Northern region, we received 10 technical and commercial submissions in Jan 2021 and will be awarding contracts at the end of April 2021. There was also one feasibility study Killingholme that will be subject to cost recovery in 2020/21

We are intending to develop the market approach further and plan to launch a further competitive event in Q2 2022 for services in the South-East region in accordance with the Black Start Strategy and Procurement Methodology 2021/22.

It is also worth noting that the outcome of the Distributed Re-start project will be known in the short to medium term in accordance with the Black Start Strategy and Procurement Methodology 2021/22. In this timeframe, we expect to be running fully competitive Black Start procurement process with submissions from a wide range of technologies (including wind and interconnectors) connected at different voltage levels on the network, with DNOs playing a more active role in the restoration approach.

3b) Contracts

i) Seven new contracts were agreed with providers for service delivery in 2020/21.

- Interconnector Fast Start service, an existing service that was extended for 1 month before we agreed a full service that commenced in Nov 2020 for 2 years. This offers a valuable restoration service for the region as it provides additional resilience to those contracted and supports our ambition to diversify away from fossil fuel providers.
- A renewal of an existing service for 9 days and then a new service was agreed on the standard terms and conditions for 22 months from 1st Dec 2020 to 31st Jan 2023. This will support the SE region and our ambition to run a full tender commencing in April 2022.
- A new service at another Interconnector in the SE region for 27 months from Sept 2020. This provides additional resilience in the SE, whilst supporting on ambition for zero carbon and increasing competition.
- An extension of existing service for 13 months from 1st Sept 2020.This was agreed to be extended for one year, whilst we understand what capability will be available from the SW and Midlands tender. If necessary and in accordance with the Midlands Strategy, we may consider extending this further in Summer 2021.
- An extension of the existing service for 15 months from the 1st Oct 2020 to meet up with a start of new services being awarded as part of the Northern Tender.

ii) Two contract renewals were also agreed with existing providers that will start delivering from April 2021 and although not part of this relevant year for cost recovery, decisions were made to contract with these providers in this year.

- One of those was agreed as part of the NGESO strategy to run a competitive event for services in the Northern Region commencing from May 2022. This competitive event will broaden participation and increase competition for Black Start services in accordance with the NGESO Black Start Strategy and Procurement Methodology the ESO Forward plan, to ensure we could facilitate this event we agreed to renew existing services for 13 months.
- The other contract renewal was in the Midlands and was for a short term of 15 months to maintain capability until the Summer of 2022 to bridge the gap before the new services that were awarded as part of the tender process go live.

All contracts that were negotiated bilaterally used a combination of the cost-plus and alternative cost methods to assess value but where possible used other mechanisms such as other contracts to benchmark against. Through a robust assessment and strong negotiation, we made significant savings against the original price that the providers were seeking.

iii) NGESO also agreed to six new contracts as part of the SW & Midlands tender outcome. As briefly mentioned and referenced later in this report we did incur some costs associated with this tender; feasibility studies as part of the tender process and some initial capital contributions for the successful providers.

NGESO considers alternative options in the area and the time horizons before committing to any contract and will continually review and position ourselves to ensure we can meet Black Start requirements on an enduring basis whether that is through a market mechanism or a bilateral contract. We therefore actively look to find potential new providers to promote competition and mitigate the exposure of future operating costs and will consider the most appropriate mechanism to negotiate a new contract in accordance with the Black Start and Procurement Methodology.

3c) Payments

Availability Payments: When determining the need for specific contracts in 2020/21, we assessed the Black Start Strategy and Procurement Methodology and the impact on the restoration times before committing to negotiating a new contract. Once it was established that there was a need, we assessed the value in accordance with the Procurement Assessment approach in the Procurement Methodology. All new and renewed contracts are outlined above in section 3b.

Capital Investment: In 2020/21 we incurred costs for Capital from seven providers: -

- One contract was agreed in 2017, that included a maximum contribution of £1.4m. The works associated with this contribution concluded in 2020 and an invoice was submitted for approx. £845k.
- The Enhanced Restoration service agreed in March 2020 for 12 months incurred costs for the hiring of diesel generators with a cost of approx. £212k.
- Two new contracts, both agreed in July 2019 for services that commenced in Feb 2021 and Oct 2020 respectively.
- Three other contracts that were awarded as part of the SW and Midlands tender in Nov 2020.

All invoices received associated with these new contracts were validated and assessed against the works contributions that were agreed as part of the CSA and in accordance with the milestone schedules contained within.

Feasibility Studies: NGESO has produced a standard outline for feasibility studies to make it easier to compare the content, and therefore to assess the proposed costs. We adhere to the principles outlined in the Procurement Methodology by ensuring that as far as possible any costs of these studies have been procured in an economic and efficient manner and, where feasible, the provider can tender for the study.

The costs for feasibility studies can vary, for instance the size and type of the generator will influence the cost as well as if the Original Engineering Manufacturer (OEM) can use learning from previous studies. On occasions, it can be cheaper for a study to be carried out on a new unmodified generator compared to a retro-fit on a generator that has been modified. In some cases, the providers will tender for the OEM costs where possible which can reduce cost to NGESO and some providers will waive their own internal costs for facilitating the study.

In 2020/21 we incurred costs for nine feasibility studies, all of these were associated with the SW & Midlands and Northern Tender ("Tenders") to facilitate competition in accordance with our Procurement Methodology and the RIIO-2 Business Plan 2021. As per the Methodology we capped the cost of each of these studies to £150k each with an expectation that each of the providers would tender for the OEM costs but any further costs incurred by the provider would not be passed through.

NGESO expect to receive a further number of Feasibility Studies in 2021/22 from the Tenders, primarily from the Northern Tender as the studies were submitted in January 2021 and so far, only received one invoice.

Testing: As per OC5 of the Grid Code, NGESO must test existing Black Start providers to prove their capability to Black Start in accordance with their contractual terms and the Grid Code requirements where appropriate. NGESO will work together with the provider to develop a strategy to test the unit at the most economic and efficient time, informing the market and mitigating any distortion in accordance with the Procurement Methodology.

In 2020/21 actual physical Grid Code tests with providers were put on hold because of the Pandemic. We did however test two providers using a market mechanism to ensure the provider was fairly compensated, whilst being transparent to the market using our proven cost reimbursement methodology. As per previous submissions test costs do vary considerably based on the technology type and size of station.

We are also seeking cost recovery of two previous tests carried out in previous scheme years. One was tested in 2019 using the cost reimbursement methodology and validated by the ESO, however the provider did not submit the invoice until this relevant year 2020/21. Another Feasibility test was carried out in Sept 2016, but the provider had not put forward the invoice of £41,823 until this relevant scheme year. The assessment of the test was carried out prior to the approved Procurement Methodology; however, we used a cost-plus approach to validate the proposed cost.

Warming: In 2020/21 NGESO further evolved its warming strategy to continue to drive costs down, resulting in a significant reduction in costs from the previous year. During this year NGESO spent £285k on a short-term contract to warm a Black Start capable station and a further £2.19m to move an outage from a Black Start station to ensure we met our Summer Readiness Strategy and remained compliant our requirements.

- The short-term warming contract was put in place in June 2020 to ensure we maintained Black Start availability in one region when a number of outages to capable providers overlapped. We reviewed options in accordance with the warming strategy and assessed the most economical solution was to contract and run the provider in the Balancing Mechanism (BM). The total cost of running in the BM was approx. £395k , after removing margin savings and in accordance with the Secondary System benefit principal in the Procurement Methodology , the actual cost attributed to Black Start was approx. £285k.
- The action taken to move an outage of a provider in the SE region was a consequence of moving their outage from original date of June to August, which then clashed with a significant planned outage with another provider in this region. This atypical issue was identified in our weekly Summer Readiness Strategy in early June and we reviewed all options, including moving the planned outage or warming another provider, a coal-fired power station in an adjacent region which would have been as costly but also non-compliant as we must maintain one service provider in each region. There was also a risk the outage to the provider extended and then we would have needed to warm the coal-fired power station as well, so after careful consideration we concluded that we would move the outage to maintain provision and capability. There is not a natural place for this cost to sit, as we did not actually warm the contracted provider, but moving the outage means we mitigated any costly warming actions. From September 2020 we have now contracted with further providers in this region therefore mitigating the risk of outages overlapping.

When actions are taken to warm plant for Black Start readiness, the voltage or any other secondary benefit such as system margin is taken out and recovered through the Balancing Service Use of System scheme. Accordingly, in respect of Black Start total costs, NGESO is recovering the warming cost only. The Procurement Methodology explains the concept of secondary benefit. In the case of the actions on the short-term contract we spent approx. £395k but £285k is attributed to Black Start, as the other cost has been saved on margin.

General Provisions

Generally, NGESO publish information on the Balancing Services we intend to procure and subsequently do procure. In doing so, we seek to provide market participants and other interested parties with sufficient information without compromising the commercial position of any contracting party.

Disclaimer

All information published or otherwise made available to market participants and other interested parties pursuant to this Black Start Allowed Revenue is done so in good faith. However, no warranty or representation is given by National Grid Electricity System Operator Limited., its officers, employees or agents as to the accuracy or completeness of any such information, nor is any warranty or representation given that there are no matters material to any such information not contained or referred to therein. Accordingly, no liability can be accepted for any error, misstatement or omission in respect thereof, save in respect of a misrepresentation made fraudulently.

Appendix 1

Lost Generation Costs = MAX (0, (Power Price - Gas cost -Carbon cost -Fixed cost)) * (Capacity – MEL) * H

Where:

Power Price	is the hourly N2EX UK Day Ahead Auction Price (£/MWh)
Gas cost	= (Gas price/Gas conversion factor * 10)/ Gross Unit efficiency factor
Carbon cost	= (CPS rate + (EUA price/FX)) * Emission factor
Fixed cost	is [ ]/MWh
Capacity	is [ ] MW
MEL	is the Maximum Export Limit of unit (MW)
H	is the number of hours during which the relevant unit within the Power Station is made unavailable due to Black Start testing.
Gross Efficiency Factor	is [ ]%
Emissions Factor	is [ ]
Gas Conversion Factor	is 29.3071 (therms to kWh)
CPS rate	is UK Carbon Price support rate (£/tonne)
Gas Price	is the hourly UK NBP Natural Gas Forward Day Ahead price (p/therm)
EUA Price	is ICE ECX Emission December 2021 commodity (£/MWh)
FX	is the £/€ daily rate from the Bank of England

Exercise Payment =	**Start cost + Auxiliary unit cost**

Where:

Start Cost	is Fixed cost of no more than [TBC] if the unit is running prior to the test
Auxiliary Unit Cost	is (10000 therms*Gas Price)/100