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Black Start Procurement Methodology

**Produced in accordance with Standard
Condition C16 of the National Grid
Transmission Licence**

**Effective from
1st April 2018 to 31st March 2019**

DOCUMENT HISTORY

Version 1.0	Aug 2017	Ofgem approved version
Version 2.0	April 2018	Ofgem approved version

BACKGROUND

In its role as National Electricity Transmission System Operator, National Grid Electricity Transmission plc (National Grid) has produced this Procurement Methodology in accordance with Special Condition 4G, Part B of its electricity transmission licence.

This Procurement Methodology details how Black Start provision will be procured against the technical requirements detailed in the Black Start Strategy. This methodology will also set out the approach that will be taken in evaluation of Black Start Capability and the approach to Black Start procurement. It will also outline our approach to assessing the trade-off between an economic and efficient level of service provision for consumers and the restoration timeframe that such provision will deliver.

As part of our procurement of Black Start, we will continue to follow our over-arching Procurement Guidelines as prescribed in condition C16 of National Grid's electricity transmission licence¹. This Black Start Procurement Methodology document, produced in accordance with Special Condition 4G (Black Start Allowed Revenue) should be read in conjunction with the Procurement Guidelines and the Black Start Strategy document, produced in accordance with Special Condition 4G, Part A.

This Procurement Methodology is made up of the following parts:

- 1. Procurement Principles**
- 2. Procurement Assessment**
- 3. Market Information**

Unless the context otherwise requires, words and expressions used in this Procurement Methodology shall have the meanings ascribed to them in the licence condition 4G of the Grid Code.

TECHNICAL REQUIREMENTS

Black Start services must meet the Black Start service technical requirements as outlined in the Black Start Strategy and as outlined in the Stage one and Stage two Feasibility Studies².

For clarity, a Black Start service is defined as a provider, or combination of providers who can meet the three basic requirements for Black Start; to start up following a shutdown independently from external supplies, to be able to energise the transmission network and to be able to provide block loading of local demand.

The evolution of the restoration strategy and the development of new technology options to provide Black Start are interlinked and a development in one may trigger both a need and an opportunity in the other. Therefore revisions may be required to either the Black Start Strategy and this Procurement Methodology to enable new technologies to participate or Restoration Methods to be applied.

¹ <http://www2.nationalgrid.com/uk/industry-information/electricity-codes/balancing-framework/transmission-license-c16-statements/>

² <http://www2.nationalgrid.com/uk/services/balancing-services/system-security/black-start/>

PART I: PROCUREMENT PRINCIPLES

As prescribed in the C16 Procurement Guidelines Black Start is a System Ancillary Service. System Ancillary Services are sub-divided into two parts; part one services are the Mandatory services required from all licenced generators, and; part two services, such as Black Start, which are only provided by some generators on a site by site basis to meet specific system requirements.. These services are set out and described in condition 8.1 of the Grid Code.

When procuring Black Start services, National Grid's Procurement Methodology will align to the following principles:

- A clear and transparent requirement.
- Enabling competition, where appropriate.
- Not to unduly discriminate against technology type.

In procuring Black Start services, National Grid will consider the most appropriate utilisation of the following mechanisms in order to best meet the above principles:

Market Mechanism - where it is clear there is, or is likely to be, sufficient competition as defined in Appendix 2 in the provision of a Black Start service, National Grid will seek to procure that service via an appropriate competitive process or market mechanism. In such instances, National Grid shall provide a statement indicating the requirement, processes and terms under which a tender would be run and how the contracts will be awarded.

Bilateral Negotiations - where it is believed there is insufficient competition to hold a tender to procure a Black Start service, National Grid may determine that it is more economical to individually approach potential providers and assess and contract for such provision on a negotiated bilateral basis.

National Grid will promote competition by making it clear to potential providers that other options are available and being actively pursued. This may be in the form of 'lending' between zones or derogating the level of capability required if contracting to meet the stated requirement would significantly increase costs in relation to the marginal benefit of the end consumer.

National Grid shall ensure through the bilateral discussions that any Black Start contract cost will meet the approach(es) detailed in the Procurement Assessment in Part II. For example we will demonstrate that the feasibility studies procurement of the Original Engineering Manufacturer (OEM) and the capability to provide the service are contracted through an economic and efficient process as per licence condition 4G.4d.

National Grid will use the following as minimum criteria to determine what the level of competition is to meet a particular requirement and thus whether a Market Mechanism or a Bilateral Negotiation best fits the situation on a case by case basis.

- 1) Is it in line with the Black Start Strategy?
- 2) Will sufficient Black Start providers be available using published information from the Future Energy Scenarios (FES)³ and market insights? The FES provides National Grid with an outlook on plant closures and therefore whether longer term contracts could be considered?

³ <http://fes.nationalgrid.com/>

- 3) How far through the procurement process is the provider and when could the service be operational?
- 4) What existing service providers are contracted in the zone(s) and would National Grid seek to renew, noting that if National Grid developed a market mechanism, sufficient time would be required to run this process and compare against the cost of renewing the existing service?
- 5) What are the indicative commercial terms if known and are they competitive?

PART II: PROCUREMENT ASSESSMENT

Once an offer has been received, either through a market mechanism or a bilateral negotiation, National Grid shall then assess the cost of that service against the value it contributes to the regional and GB restoration timescale. This section will identify the methodologies used to determine the value to current and future electricity consumers in GB of Black Start provisions. (4G.4a)

In the absence of a defined Restoration Standard, the Black Start Strategy identifies a Restoration Approach and Restoration Time expectation that takes into account regional differences. The aim of this is to set out our expectations in terms of delivery of Black Start onto the National Electricity Transmission System (NETS) against which Black Start Capability is required and procured.

Whilst the planning assumption is set at 24 hours for 60% of the national demand this must be procured at a cost that is deemed both appropriate and practicable in real time operations as detailed in the Black Start Strategy. Therefore the concept of a Minimum Service Level has been established – providing a minimum Restoration Time that is deemed acceptable given potential costs against this strategy, at all times.

A Restoration Standard is currently being explored by the Black Start Task Group lead by the Department for Business, Energy & Industrial Strategy (BEIS) and the results of this will require an update to the Black Start Strategy and this Procurement Methodology to ensure the standard is met. In lieu of this standard and therefore a clear value that society can place on restoring the NETS an hour faster, National Grid will use this Procurement Methodology to efficiently buy the best combination of assets to restore the system.

1) COST PLUS

This approach is used for new services that require significant capital contributions; to cover the costs of the investment plus variable costs for the service. During the negotiation process information such as the rate of return on the investment, installation and design costs shall be requested from providers to provide justification for the offers.

Based on the available information, analysis is undertaken to evaluate the cost to provide the service. National Grid will use our own models to provide estimates of costs and fair returns on investment to provide an indicative service cost. This will guide our negotiations as to a fair price for the service. Alternative costs (see below) will also be considered for new build or retrofits.

2) ALTERNATIVE COSTS

This approach is the primary assessment approach for existing Black Start providers, although can be used for new providers or retrofits, and is based on using real and forecast alternative costs to calculate Black Start service costs. The technical capability of the provider as well as the contribution to the restoration will be taken into consideration alongside existing service providers' prevailing costs and future operating costs in the determination of value.

There are a number of geographical zones where thermal assets are closing or scheduled to close and we would review market conditions and forecast future costs to determine the economic value of services. For example National Grid may procure Black Start Capability from providers at a higher overall contract service cost, if analysis indicated an alternative provider was forecast not to be economic to self-dispatch for a significant part of the year and so require extensive warming costs to deliver its capability.

In zones where multiple units of the same technology type are forecast to require extensive warming, we shall factor this into our wider strategy consideration. For example, we will procure an alternative technology subject to meeting the procurement principles and Black Start Strategy (with lower forecast costs) to ensure that we reduce the requirement for multiple units that require warming and improve diversification. This in-turn can drive competitive tension between the remaining units that do require warming.

3) PORTFOLIO

This approach is used where we have multiple stations from the same provider to drive a discounted rate and where possible enable National Grid to be in a stronger negotiation position for other strategic units.

This approach can help drive down the costs with the provider that has multiple units but also foster positions where we can be robust in our negotiations with other providers knowing that we create walk away options as long as the Black Start Strategy is not impacted and the impact on restoration is not adversely affected.

OTHER CONSIDERATIONS

Evaluation of provider longevity. With forecast market conditions uncertain and a number of traditional sources closing, the life of the station is an integral part of the decision to award Black Start contracts when a capital contribution is required.

Evaluation of secondary system benefits. This procurement approach aims to ensure that the entire system operation is secure and economic. To that end cost savings are considered where secondary benefits have been identified

When making an assessment of secondary benefit we perform analysis to determine what the system requirements are likely to be, both locally and nationally, and to what extent the Black Start provider contributes to the competitive procurement of those requirements. This can include the displacement of the need to procure balancing services from other providers, e.g. voltage support but can also increase the level of competition between potential providers of a service and thus lower prices.

Further information on secondary system benefits in Appendix 2

Requirement to warm stations. Where units are likely to require warming, we consider the provider economics, including a view on ancillary service revenue, wholesale market revenue, Capacity Market contracts as well as the fixed costs associated with the station. This is used to assess what is a reasonable level of top up payment that should be made to the provider in order to ensure the station is warm and thus Black Start capable.

- Forward spreads are used to determine potential wholesale market running and profit.
- Historic analysis of running patterns and spreads are used to inform the likelihood of the unit dispatching for the warming period.
- The future outlook (for the warming period) is also evaluated (including spread analysis) as well as the top-up that may be required to incentivise the unit to run.

This analysis informs the negotiation strategy, which seeks to minimise any top-up paid to the counter-party and determines appropriate contractual mechanisms in order to minimise distortion in the energy market.

Flexible Restoration Approach the Black Start Strategy Restoration Approach adds flexibility to provider diversity and locational considerations. Here the focus shifts from the number of parties within a geographical zone, to the impact a particular provider (or combination of providers) has on restoration within a region and on GB as a whole. If a situation arose where a zone had three providers available and a neighbouring zone only had one, if the incremental costs of contracting an additional provider in the under-contracted zone could be reduced by using a provider from a neighbouring zone, then this would be considered during the assessment process. This would also work in zones where providers are contracted but with warming requirements. We would evaluate the use of a provider from a neighbouring zone to provide Black Start Capability rather than agreeing a potentially high cost warming contract.

SUMMARY

National Grid will use the above approaches and criteria to determine whether procuring Black Start services will provide consumer value. For example if the incremental cost of an additional service is excessive and provides marginal benefit, National Grid may decide not to contract providing the impact on the resulting Restoration Time does not have an unacceptable impact on the Minimum Service Level.

The Minimum Service Level has been determined as a Restoration Time which will allow for variations of number of available providers across GB. Should there be a situation where the Minimum Service Level cannot be maintained, either through lack of Black Start Capability or a significant increase in costs to maintain the Minimum Service Level, National Grid will inform both BEIS and Ofgem of this and demonstrate the actions that have been taken to reduce the impact to system restoration and detail the changes being proposed to the level of provision. This situation may arise due to extreme unforeseen circumstances, for example a type fault on an asset class.

FEASIBILITY STUDIES 4G.4d

National Grid will determine a process to assess whether it is economic and efficient to incur feasibility studies costs to test new providers. (4G.4d)

Before entering into a new Black Start contract a potential service provider must demonstrate that they can become Black Start capable. This is done through a two stage feasibility study approach. The Stage One study identifies the potential provider's Black Start Capability at a very high level, to consider whether a more detailed study should be carried out.

If Stage One⁴ is successful in identifying potential Black Start Capability, and subject to the Black Start Strategy, a Stage Two study will be commissioned. This study will be more detailed and shall determine the level of Black Start Capability that can be achieved. It will also identify if any testing is required to demonstrate this capability, identify capital expenditure and associated works required and indicate expected timescales for which the service could commence. National Grid supports the funding of Stage Two feasibility studies and this forms part of the overall Black Start costs.

Before committing to studies and especially funding Stage Two, National Grid will consider the following criteria:

1. Current and future anticipated Black Start Capability in GB, in line with the Black Start Strategy.
2. The impact of this new provider on the Restoration Time.

⁴ <http://www2.nationalgrid.com/UK/Services/Balancing-services/System-security/Black-Start/Black-start-about-the-service/>

3. Costs of the feasibility study and evidence from the provider that this has been procured economically, including assessing costs against previous feasibility studies and demonstrable evidence of negotiations with OEM's.
4. Whether the feasibility study cost is in line with the annually submitted costs.

Current actual and forecasted Feasibility Study costs are submitted to Ofgem on an annual basis. This yearly assessment will review the incurred costs to date for the previous financial year with a supporting narrative to explain the decisions made against the forecasted costs. This report shall also provide forecasted costs for the forthcoming year's feasibility studies with an explanation of why National Grid has decided to move forward and fund these studies.

The full process for contracting a potential Black Start provider is in Appendix 1 – Fig 1

TOTAL BLACK START COSTS 4G.4b

National Grid shall demonstrate how consumer value is assessed across all Black Start services contracted cumulatively. National Grid will continue to procure economically, whilst developing new and alternative providers to assist with the medium and long term strategy in accordance with the Black Start Strategy. When assessing value to the end consumer and overall combined cost National Grid shall consider the following:

- Capital Expenditure
- Availability Payments
- Feasibility Studies (both in terms of new providers of existing technology and new providers of emerging technology)
- Testing
- Warming requirements

Capital Expenditure new Black Start services are likely to require significant capital investment as outlined in the Cost plus approach.

Availability Payments where capital has been paid off, National Grid would expect a capability payment to reflect that reduction in cost.

Feasibility Studies National Grid will ensure any costs incurred through feasibility studies incurred by service providers will have been secured through an economic and competitive process. As an example, service providers will be expected to tender for their OEM. If this isn't feasible, National Grid will expect the service provider to demonstrate why they have chosen to use only one provider and we would expect the costs to be itemised so National Grid are able to challenge the cost and content of the feasibility studies to drive value.

Testing National Grid 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. The testing requirements are detailed in OC5 of the Grid Code.

Warming Requirements Where National Grid believes that Black Start providers will not be available by self-dispatch and warming is required, it will reflect that cost in the overall value of the service. This fits under the Black Start Cost allowance and will therefore also be considered in the overall total Black Start costs

PART III: MARKET INFORMATION

The Minimum Service Level has been defined in the Black Start Strategy which provides a minimum Restoration Time that is deemed acceptable given potential costs. This Procurement Methodology will detail how National Grid procures Black Start services against the Minimum Service Level.

Due to security considerations, the names of parties that are contracted to provide Black Start services, or specific contract details that may compromise their anonymity will not be revealed nor placed in the public domain.

In absence of this information, National Grid will provide as much information as possible to enable transparency and effective price discovery for the Black Start service in the Restoration Product roadmap to be published shortly and the Monthly Balancing Services Summary (MBSS)⁵. This will include but not be limited to, the amount paid for the service in aggregate and the number of units in the portfolio. In addition and as outlined in the Product road map National Grid will develop and publish metrics that identify and better describe how different elements of the service are valued.

SHORT TERM

In the short term the procurement approach will follow our current approaches, including the cost plus for new providers, alternative costs including other units to drive competitive tension and a portfolio approach to secure multiple assets at a lower overall cost.

National Grid has increased transparency around the Black Start market and provided signals of service need, technical requirements and guidance for service opportunities in a clear and consistent manner through the SN&PS published in June 2017 and the relevant sections on National Grid's website. The product road map will also include a section on transparency.

National Grid shall continue to seek alternative providers for providing Black Start, whilst doing so we will continue to review existing services and drive value where possible, through:

- a) Review and renew existing Black Start contracts if economic to do so and where possible facilitate competition in the negotiation of these renewals.
- b) Reduce warming need by supporting retrofitting of Nitrogen Capping if economic.
- c) Contract for warming where economic to do so.
- d) Improve capability of existing services by increasing water reserves of hydro stations.

MEDIUM TERM

In this timeframe, National Grid will look to expand the number of providers and the technologies that can deliver Black Start services. Where sufficient competition has been established, National Grid will develop a market mechanism approach to Black Start provision against a published

⁵ <http://www2.nationalgrid.com/UK/Industry-information/Electricity-transmission-operational-data/Report-explorer/Services-Reports/>

requirement. The increased market awareness driven in the short term will increase the competition to provide the Black Start service with the aim to drive down the overall cost of this service to the consumer.

If a Restoration Standard has been defined then this will be implemented and a suitable Restoration Approach derived. Consequently this could have an impact on this Procurement Methodology and will be reviewed and updated as such. If no Restoration Standard is in place during the medium term then the short, term expectation will be reviewed and amended if required.

Periodic reviews of the priorities against Black Start requirements will arise due to contracts expiring or new requirements being established. These reviews will be carried out to ensure that actions within the short to medium term to increase competition and enable new technologies to participate within the Black Start market are realised.

LONG TERM

The long term 3-5years will build upon the work of the previous years in evolving a Black Start market where possible, and identifying and valuing technologies that can provide a positive contribution to restoration. The Black Start Capability will be continued to be procured to meet the strategic requirement.

If National Grid identifies there is clear and sufficient competition, it will procure Black Start services via a tender as competition should drive down prices and therefore achieve the best value for the end consumer. The tender approach and supporting information including the requirement and the process that will be followed will be published on the Black Start section of National Grid's website.

If the Restoration Standard has been agreed and implemented an associated Restoration Approach will be developed and consequently the Procurement Methodology will be reviewed and updated where necessary. If no Restoration Standard is in place during the longer term timescale then the short term expectation will be reviewed and amended if required.

General Provisions

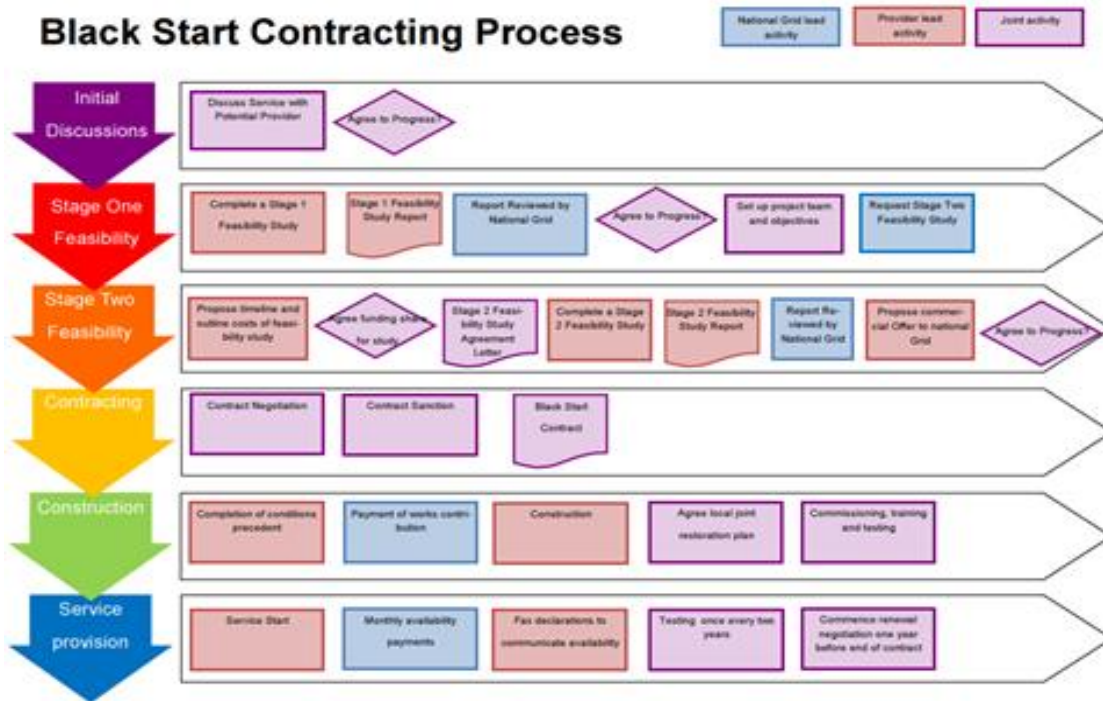
Generally, National Grid publish information on the Balancing Services we intend to procure and subsequently do procure. In doing so, we seek to provide market participants and other interested parties with sufficient information without compromising the commercial position of any contracting party.

Disclaimer

All information published or otherwise made available to market participants and other interested parties pursuant to this Black Start Procurement Methodology is done so in good faith. However, no warranty or representation is given by National Grid Electricity Transmission plc., 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

Fig 1 Demonstrates the process that National Grid typically follow when working with potential providers to develop new Black Start services.



Appendix 2

Sufficient Competition

To run a competitive tender National Grid would assess on a case by case basis but generally would require a minimum of three independent providers from different companies with equal capability in a zone, to ensure fairness. An objective assessment will be carried out if the technical capability is a factor between providers. In such instances National Grid shall provide a statement indicating the requirement, processes and terms under which a tender would be run and how the contracts will be awarded.

Secondary System Benefits

When assessing the value of a Black Start contract National Grid will also assess other ancillary services that will be inherently delivered. For example where a Black Start provider also has Reactive Power capability and is located in an area where actions are regularly taken to manage voltage levels this will be considered as part of the value assessment.

In such a scenario National Grid would assess the expenditure on the Black Start provider, less the amount that would have been spent on securing alternative voltage management units. This can be compared against other Black Start options which may or may not provide some secondary benefit and a holistic cost assessment can be made.

When making an assessment of secondary benefit we perform analysis to determine what the system requirements are likely to be and to what extent the Black Start provider contributes to those requirements. This will include not only displacement of the need for alternative actions but also to what extent the procurement of this Black Start provider drives further competition. If National Grid is in a position where the contracting of the Black Start provider means we are less reliant on other providers then this too can have the effect of lowering prices.

In the specific example of voltage management benefit, the analysis will include the following.

- Review historic dispatch patterns of units capable of satisfying the secondary requirement including analysing data on the position of units over recent months and years.
- Review historic costs of managing the system requirements including evaluating costs and trends associated with managing the system requirements.
- Forecast cost of black start options.
- Forecast of the benefit of running a black start unit to satisfy both the requirements.

An example for this is shown in the below Figure below

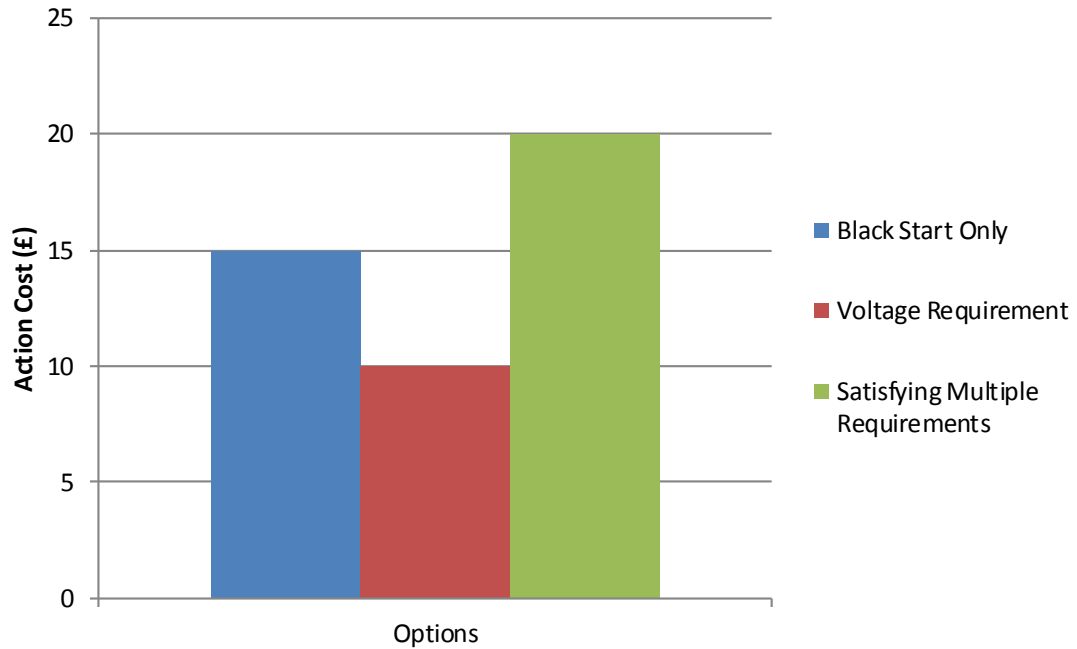


Figure 2 – Costs of managing system requirements

In the example above the cost of the Black Start only action is £15 and cost of the voltage requirement only action is £10. The cost of satisfying both requirements separately is £25. Therefore the cost of a more expensive Black Start option that satisfies both the Black Start and voltage requirement is £20. This is considered to be the most cost effective option.