Sark Electricity Commissioner

REGULATED ASSET BASE VALUATION

Sark Electricity Limited

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CONFIDENTIAL

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INTRODUCTION

WSP was contracted by the Sark Electricity Price Commissioner to complete a Regulated Asset Base (RAB) Valuation of the electricity supply system on Sark. This comprises two companies; Sark Electricity Holdings Limited, which owns the assets and leases them to its wholly owned subsidiary Sark Electricity Limited (SEL). The valuation is to be used as part of the work to determine if existing consumer electricity prices on Sark are fair and reasonable. As part of the task, an engineer and graduate trainee from WSP undertook a site investigation on Sark to determine, where possible, the age of the existing assets. This report details our findings from the site investigation, the valuation methodology and the results of our valuation.

REGULATED ASSET BASE

The RAB is a key basis for the regulation of both public and private infrastructure companies around the world and fundamentally, measures the net value of a company's regulated assets for the purpose of consumer price regulation. It is designed to provide investors with a level of confidence and return on their investment while ensuring consumer costs are minimised.

VALUATION METHODOLOGY

The RAB valuation methodology varies between regulators due to regulatory environment and company history. Many of these adjustments in methodology are driven from the regulators valuation of assets from the transfer from public to private ownership. However, in all cases the initial RAB valuation is fundamentally determined from four main components: Asset Cost, Depreciation, Asset Life and Capital Contributions. SEL's assets have been in private ownership since installation simplifying the valuation.

ASSET COST

The baseline starting point for the RAB valuation is the asset cost which can be determined in two ways. The first and simplest method is the historical or purchase price paid by the asset owner. This is the preferred methodology as the actual investment by the asset owner can be linked to return. However, SEL have not provided any records for any asset installation prices; therefore, the alternative method, i.e. "modern equivalent replacement cost estimate" has been used. With this method each asset is valued the same as the currently available as-new modern equivalent at "today's" price.

DEPRECIATION

Through our previous experience working with regulators and network operators plus additional research for this report, in every case the electricity generation and distribution assets are treated as consumable assets, and as such are depreciated over time. There have been no instances found of network owners or regulators not applying depreciation to network assets.

There are several methods for asset depreciation, however the most utilised methodology for electrical assets is straight-line depreciation. This method assumes assets are used equally throughout their lifetime with a linear relationship between depreciation and asset life. This method is simple to apply with the value of depreciation for each asset remaining constant throughout its lifetime. A criticism of this method is that it typically over values equipment relative to the actual

market value as assets will depreciate at an accelerated rate in the first few years of operation before moving to a slower rate of depreciation.

ASSET LIFE

Each installed asset type within the RAB needs to have a financial asset life expectancy applied to it to calculate the remaining life and hence the current valuation. Each regulator applies their own methodology to this, with some applying a fixed lifetime for all assets and others varying the lifetime based on the asset type. In the UK, OFGEM and the Northern Ireland regulator use fixed asset lives of 45 and 40 years respectively. Around the rest of Europe most regulators vary the asset life based on the asset type with age ranges typically between 30 and 50 years. Locally to Sark, Guernsey Electric operate with an assumed asset life of 35 years and Jersey varies the asset life by type up to a maximum of 40 years.

Based on this information, the asset life expectancy for each group of assets in this valuation is shown in Table 1.

Table 1 – Asset Life Expectancy

Asset Type	Accounting Life Expectancy
High Voltage Cables	50 years
Low Voltage Cables	50 years
Transformers	50 years
HV Switchgear	40 years
LV Distribution	40 years
Meters	20 years
Diesel Generators	25 years

It should be noted that these estimated asset lives are purely for financial modelling and give the period for which the asset owner is able to recoup their investment and receive a return for the operation of the asset. While these ages closely reflect the asset life, in practice, it is possible for assets lives to be extended beyond these dates due to their operational history and good maintenance practices.

CAPITAL CONTRIBUTIONS

The RAB is designed to cover the cost of depreciation in line with the asset life and provide the owner/investor with a return on their investment. When an end customer makes a partial or full capital contribution for the provision of a connection to the network, the investment is not made by the asset owner, therefore it is removed from the RAB. Costs for maintenance of the assets are part of the operating expenditure of the company and are therefore outside of the scope of this report.

BACKGROUND INFORMATION

To complete a thorough and full investigation, standard background information was requested from SEL to provide, as a minimum, a starting point for the valuation. The information requested was:

- The latest Asset Register containing the following:
  - Equipment Type
  - Manufacturer + model description
  - Location (or route for cables)
  - Current operational status
- Further information potentially available including the year of asset manufacture, SEL purchase/commissioning dates and purchase price of the assets
- Log or note of assets paid for partially or wholly by end customers to provide them with a connection to the network.

In addition to the above documentation, facilitation of access to requested locations during the site assessment period was requested. This was to enable the assessment of equipment to determine any information missing from the above list.

A request was first made by the Commissioner on 21st January 2019. This was followed by a request under Section 5 of the Control of Electricity Prices (Sark) Law, 2016, to SEL on 24th January 2019.These requested the data described above and to facilitate access to assets as required during a site visit between the 4th and 5th February 2019.

Aware of SEL's confidentiality classification of the requested data, it was confirmed at the time of the request that WSP would be willing to enter into a Non-Disclosure Agreement (NDA) with SEL. This was to provide SEL with assurance of WSP's data security processes and ultimately the confidentiality of any sensitive operational and commercial data they shared.

Unfortunately, despite requesting this prior to any meetings, the NDA was not provided to WSP until the afternoon of the 4th February. It was the view of WSP's lawyers that the NDA provided contained parts that were not standard market practice and as such could not be accepted by WSP. This included, among other items, a severe restriction on WSP's ability to report findings and results to the commissioner, to the extent that WSP would be in breach of contract upon signing the NDA. WSP's feedback and comments on the NDA were passed back to SEL and their representatives in a letter dated 6th February, but a suitably modified NDA was never provided.

As of the date of this report, WSP have not received any of the above information from SEL to assist in the determination of our valuation. Without this latest information, a valuation has been made utilising information shared under the confidentiality agreement between WSP and the commissioner, publicly available details and data that was gathered during the site assessment period.

ASSET AGE ASSESSMENT

The site assessment was carried out by WSP engineer and graduate trainee between 3rd and 6th February 2019. The site assessment included a meeting with SEL at 9.30am on 4th February at the Power Station's office, though SEL denied the WSP team access to the power station equipment.

Without SEL-facilitated access to assets, WSP relied on publicly available information to locate the assets around the island. With this approach, we were able to locate and date the majority of the High Voltage (HV) substation equipment and collect some information regarding the Low Voltage (LV) network and equipment. Through our conversations with various parties during the site investigation, including SEL, the fire officer Kevin Adams, business owners and residents, we were able to gather further information regarding less accessible assets such as cables.

HV NETWORK ASSETS

SWITCHGEAR

All the HV switchgear on the island is of the same type as confirmed by SEL. This was originally manufactured by Long and Crawford before being sold to Alstom in 1988. As noted by SEL, the equipment is no longer manufactured with the units installed on Sark, that can be dated accurately, manufactured between 1982 and 1999 as seen in Figure 1 below.

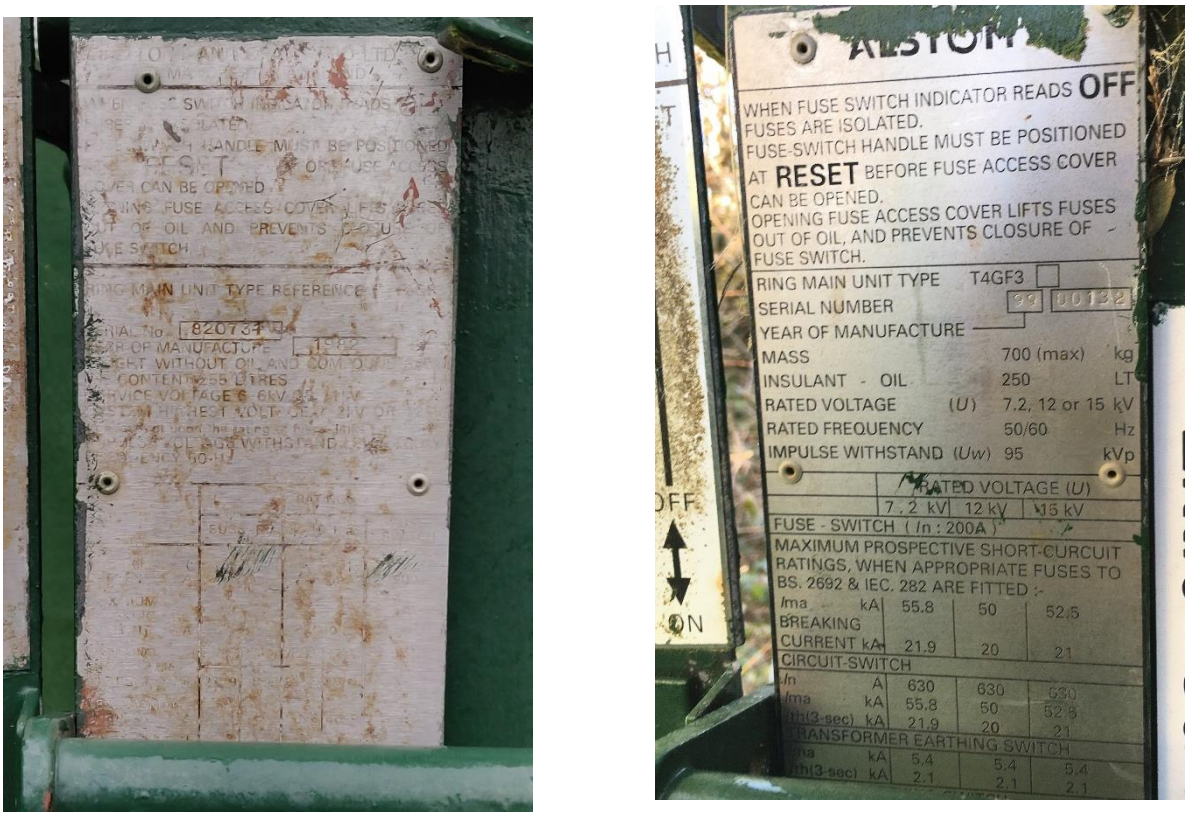


Figure 1 - Oldest and Newest Switchgear with visible dates found during site assessment

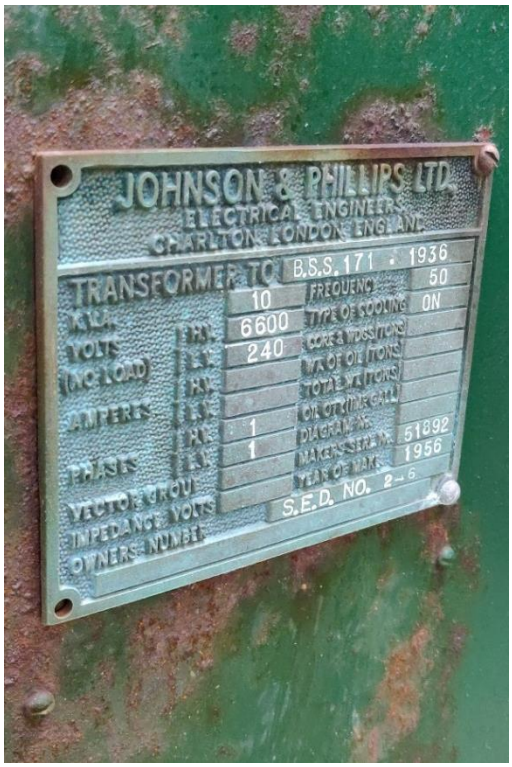
For the switchgear that we were not able to age due to not having access during the site visits, an assumed date of manufacture was used based on the dates above. Some other switchgear units found on the island have name plates without a date of manufacture, as shown in **Figure 2**. These

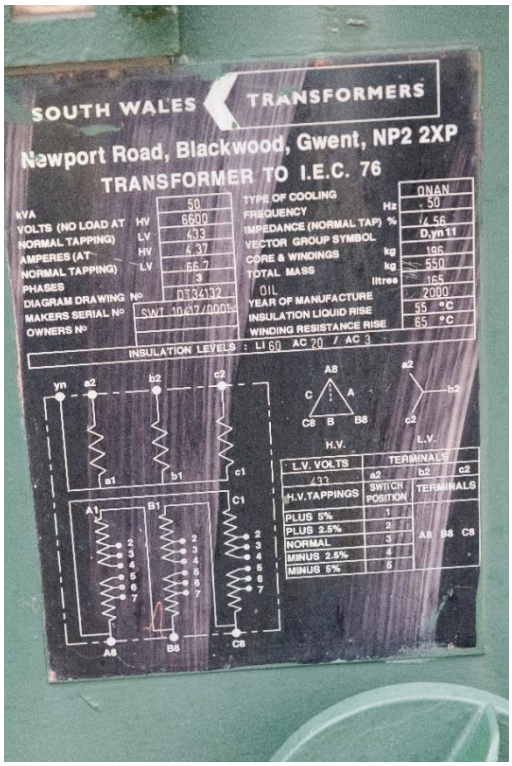
were of a different style to the other plates in **Figure 1** and referenced a standard: ASTA 22:1967. No public information could be found for the standard and the company holding the ASTA standards were unable to find reference of it on their systems. Due to the difference in name plate and the date of the standard, it has therefore been assumed that these units were manufactured in the 1970s when the standard was likely to be applicable.

Figure 2 - Switchgear Name plates without manufacture date

TRANSFORMERS

The 6.6/0.415kV distribution transformers fall into several size brackets with dates of manufacture from 2010, all the way back to what is assumed are the originally installed units from the 1950s. For transformers without name plates, an attempt was made to match them to an equivalent transformer with an available date based on rating and overall design. Pictures of some of the transformer name plates are shown below in Figure 3.





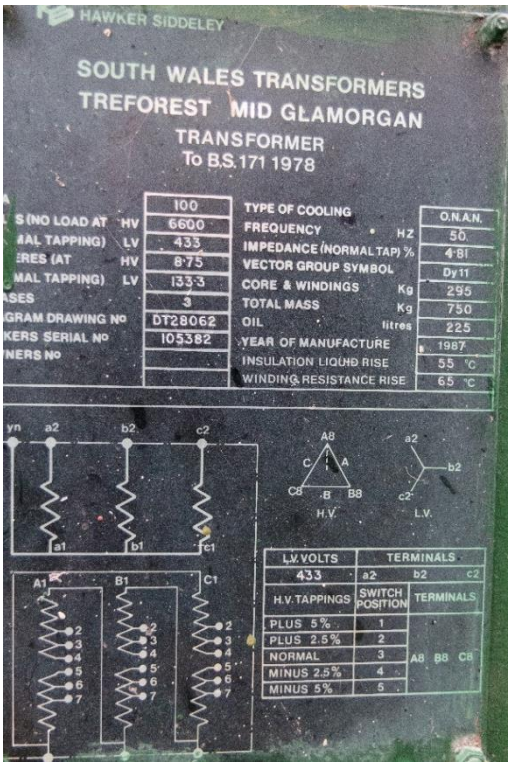


Figure 3 - Selection of Transformer Name Plates with Manufacture Dates

CABLES

In conversation with SEL it was noted as common knowledge that the 11kV sections of network, that replaced the last of the overhead lines, were installed by the current owner's son in 2008. This was backed up by the identification of 11kV cables which were dated from 2006 and 2007.

No information is available to accurately determine the age of the 6.6kV cables installed on the island, other than the fact that it was known that installation was carried out before the 11kV cable installation. It has therefore been assumed that these sections of cable were installed in the mid-1990s on average.

The HV cables across La Coupe and on Little Sark are an old paper insulated type of cable with plans for the replacement of the cables being worked on by SEL for several years. Therefore, the cable has been deemed to be fully depreciated in the RAB.

Figure 4 - Cable at Le Coupe

LV NETWORK ASSETS

LV DISTRIBUTION EQUIPMENT

Unlike HV equipment, there are no visible date marks on LV equipment and it is a network that is adjusted far more regularly as new customer connections are made. Of the equipment inspected, this ranged from a distribution box installed in the last few years all the way through to an LV pillar constructed by a company that ceased trading in 1997. Therefore, an assumed average installation date was used for each group/type of equipment.

CABLES

As with the HV Cables, there is no information available to accurately date the cables installed on the island. During the investigation, sections of cable dated from 1989 up to 2010 were found along with cables with a colour code standard that was superseded in 1977. Based on these dates, an assumed average age was calculated and applied to all LV cables.

POWER STATION

DIESEL GENERATORS

The Power Station contains four diesel generators to supply the whole island with a level of redundancy for any unplanned outages. There are two 375kVA generators that were commissioned in 1995 and 1999, a 600kVA generator that was commissioned in 2002 and a 720kVA generator commissioned in 2004. These commissioning dates were provided by SEL via email on 22nd February 2019.

TRANSFORMERS AND SWITCHGEAR

It was not possible to inspect the HV distribution equipment at the power station; however, it is known that the switchgear is the same type as the rest of the HV switchgear on the island and an average age has been applied. The two transformers at the power station are rated at 600kVA and it has been assumed these were installed at the same time as the larger two generators in the early 2000s.

AUXILIARY EQUIPMENT

Auxiliary equipment such as generation control panels, fuel storage tanks and additional cooling equipment was not inspected, and no age information has been provided. From studying photos made available to us and from those available in the public domain it appears the equipment is of a similar age to generators. It has therefore been assumed that this equipment was installed alongside the latest generators to support their operation.

ASSET REFURBISHMENT

Any refurbishment or life extending maintenance beyond manufacture guidelines will increase the operational life of the equipment. If any works of this nature are carried out after purchase and installation by SEL it is classed as an operational cost with no impact on the RAB. However, purchasing second hand equipment refurbished or not, does impact the RAB valuation with increased risk of over or under valuation of assets when having to utilise the as-new price method.

IMPACT ON THE RAB

The straight-line depreciation method is criticised for over valuing assets compared to the actual market value during the asset lifetime. This is because the method assumes that an asset is used equally throughout its life and is directly proportional to the value. In practice, the market value is always below this as assets depreciate at a faster rate relative to the straight-line model at the start of life.

Purchasing second hand equipment with this valuation method increases the risk of over or under valuing the asset relative to the actual price paid. For equipment with no life extension works carried out, there is a high probability of an over valuation within the RAB. This in turn will provide a larger depreciation payment and returns on the RAB above that specified by the regulator leading to a higher than required consumer price.

Conversely, equipment with life extension refurbishment works completed prior to purchase will have a higher market value than the equivalent refurbished equipment. Depending on the price paid, this may be above the calculated RAB leading to an undervaluation. The depreciation payment and return on the RAB will be reduced, with the asset owner potentially not recovering their investment.

VALUATION CHANGES

With no data or details provided by SEL regarding the value and date of their capital investment in the network, the base assumptions required to calculate the RAB will lead to inaccuracies when compared to SEL's actual investment. These inaccuracies are increased with the purchase of second hand equipment as market prices and operational history can have a large effect on price and remaining operational life.

It is known that assets, in particular the HV switchgear as it is no longer manufactured, have been purchased used. SEL have stated that all equipment was purchased as "refurbished" but have not provided any documented evidence of this. From the site investigation, there was no visible evidence of any refurbishment of equipment beyond what would be deemed as normal operational maintenance as specified by the manufacturer. Therefore, an assessment and suitable adjustment to the asset life and RAB valuation either way to improve accuracy cannot be made on the available evidence.

VALUATION

AS NEW REPLACEMENT VALUE

In determining the as-new asset replacement value of the installed assets, the existing knowledge base of supply prices has been utilised by WSP. This information has been gathered from working on capital investment and price benchmarking projects with multiple UK Distribution Network Operators (DNOs) and in delivering projects on different sized networks (including islands) around the world. Labour and installation costs for the island have been provided to us and are lower than the comparable UK costs. We have found that the increase in asset prices due to delivery and small batch orders is offset by the reduced labour and installation cost.

Therefore, the total replacement value for each asset is comparable to current UK prices, which have been verified on a limited basis with cross referencing to the SEL installation costs that have been made available.

CAPITAL CONTRIBUTIONS

SEL are unable to provide any records detailing the assets paid for, either in full or partially, by customers. Documentation and discussions with customers has confirmed that connection charges are passed onto the end user. Considering the available information, several assumptions have been made to determine the level of customer contribution to SELs current assets as follows:

- HV Cables and substations were funded 100% by SEL with no customer contributions

It has therefore been assumed that network upgrades (in particular the 11kV cable installation) were funded by SEL only, even if they were driven by changes in customer demand.

- Customers paid for 100% of all single-phase cables installed

Single-phase cables are installed from a supply point to the end customers meter. Therefore, it has been assumed that this cable was paid for in whole by the end customer.

- Three phase cables to large consumers, where possible to identify, are 100% customer funded.

It is assumed that the three phase LV network has been funded by SEL, apart from the assets that are identifiable as providing a dedicated three phase supply to an end user. This has been assumed as 100% customer funded.

Based on these assumptions, the total customer capital contribution is £770,431.

VALUATION RESULTS

In calculating the RAB valuation, the SEL assets were split into six categories for clarity: HV Cables, LV Cables, HV Distribution, LV Distribution, Transformers and Generation. The results of the valuation are provided in Table 2 below.

Table 2 – Valuation details

Category	As New Replacement Valuation	Regulated Asset Base Valuation	Depreciation Cost
HV Cables	£957,408	£527,125	£19,148
LV Cables	£1,626,966	£359,745	£17,131
Transformers	£68,650	£36,141	£1,373
HV Distribution	£174,500	£44,150	£4,363
LV Distribution	£148,300	£81,360	£4,388
Generation	£441,520	£154,320	£17,661
Total	**£3,417,344**	**£1,202,841**	**£64,063**

In calculation of the RAB valuation, as detailed earlier, many of the asset ages have been assumed based on gathered information and engineering assessment. To account for this, a margin of error of 10% has been applied to the assumed age of cables and LV distribution equipment. This provides a range for the RAB valuation as detailed in Table 3 below.

Table 3 – RAB Valuation with error margin applied

Category	Minimum RAB Valuation	RAB Valuation	Maximum RAB Valuation
HV Cables	£486,236	£527,125	£568,014
LV Cables	£274,091	£359,745	£445,398
Transformers	£36,141	£36,141	£36,141
HV Distribution	£44,150	£44,150	£44,150
LV Distribution	£66,530	£81,360	£96,190
Generation	£154,320	£154,320	£154,320
Total	**£1,061,468**	**£1,202,841**	**£1,344,213**

As noted previously, these valuations are purely for financial modelling purposes for the calculation of the return on asset investment as part of the overall electricity price. The valuations in Table 2 and Table 3 do not represent the current market value of the SEL network assets.

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