EXECUTIVE COUNCIL

PUBLIC

Title of Report: Interim Power Station Proposals

Paper No: 138/15

Date: 29th July 2015

Report of: Director PWD/Power Station Manager

1.0 Purpose

To appraise members of the current situation and to provide recommendations for an interim solution while the medium/long term power solution is evaluated. This solution is aimed to provide system resilience for a maximum of 5 years while the medium longer term permanent solution is prepared.

2.0 Recommendations

It is recommended that members approve:-

2.1 The interim proposal for the procurement of the stores package and the release of **£REDACTED** from 0957 3235 is recommended to SFC for the proposed purchase.
Responsible officer: Director Public Works
Due Date: August 2015

2.2 The interim proposal to construct a new storage facility to house the spares package and the release of £ **REDACTED** from 0957 3235 is recommended to SFC for the completion of the works (including bringing forward £ **REDACTED** funding from 2016/17).
Responsible officer: Director Public Works Due Date: August 2015

2.3 That the report is published but that the financial information is redacted by virtue of the Committees (Public Access) Ordinance 2012, Schedule 3, paragraph 10 “Information about relevant contracts and negotiations”.

NOTE: All the above recommendations are an interim solution to the immediate energy requirements and are not a permanent solution.

3.0 Additional Budgetary Implications

	2015/16	2016/17	Total Project
Capital Budget	£400,000	(£400,000)	£nil

4.0 Background

4.1 Brief history of recent failures- Table 1: Listing of the series of failures that occurred during the month of May 2015. It can be seen that the capacity was down to a level where some power rationing took place. Pony's Pass Quarry was denied production for several days during week 22. Other relatively recent critical times where June 2014, when four engine sets were unavailable due to a mixture of major service and breakdowns. Also, March 2011 through to May 2011 with a prolonged period of only 4 generating sets available.

Table 1

Date	GS8	GS7	GS6	GS5	GS4	GS3	GS2	GS1	Capacity
	1.5 MW	1.5 MW-past due service	1.0 MW	1.0 MW	0.3 MW	0.5 MW	Major Service	0.3 MW	**6.1 MW**
			Breakdown-Coolant leaks						**5.1 MW**
7th		**Breakdown-Excitation fault-major power failure**							**3.6 MW**
10th	**Breakdown-Fault-Mechanical Noise at 1 MW**	1.5 MW	1.0 MW						**4.6 MW**
15th						**Breakdown-Sump full of Water**			**4.1 MW**
23rd			**Breakdown-Severe failure-Engine head and piston damage**						**3.6 MW**
26th	**Noise at 1**	1.5 MW	1.0 MW	1.0	0.3	0.5 MW	Majo	0.3	**4.6 MW**

	MW	past due service		M W	MW		r Servi ce	MW	

4.2 Normal week daytime power demand for the above period was 3 MW with occasional peaks of 3.2 MW. Expected peak power this winter is 3.4-3.5 MW. It can be seen that for most of the month of May the power station was one additional failure away from severe power rationing. The potential for failure includes but is not limited to generating set failure. Part of the main generating board dates back to 1973. The fuel lines are compromised. A number of initiatives have not worked out, we linked ourselves to SSL works some years back but these did not happen. We currently have a private sector contractor looking at costing for replacement lines.

4.3 Current Power Demand and Availability- The present peak demand is 3.2 MW and expected to top 3.4-3.5 MW this winter. Installed capacity is 6.6 MW from eight generating sets. It is unusual to have all 6.6 MW of capacity available as routine servicing of one lead set results in an immediate decrease of capacity to as little as 5.1 MW. The wind turbines at Sand Bay cannot be included as fixed reserve. However, it was the wind farm that saw us through the 2011 power shortfall. Servicing of lead sets was limited to the summer months from July 2000, this strategy helped for a number of years but power demand now dictates we are vulnerable at all times.

4.4 Spares Package Option- We are currently vulnerable whenever a lead set is off line for maintenance. These maintenance periods can take 6 months and have been known to take longer. This was the case for Generating Set Number 8. Taken offline in January 2014 and not returned to service until July 2014. This sets unavailability played a major part in the critical period during June 2014. Routine maintenance requires the complete removal of heads, pistons, liners and bearings. Some items are replaced but others are honed, cleaned, re-seated etc. This work takes many months. The concept is simply to have a prepared/new set of spares to hand so as to immediately rebuild the engine and return rapidly to service. The cleaning, honing, refurbishment works can then happen with the generating set back in service. Our mechanical team believe they can return a set back into service in 3-4 weeks. Although the downtime will never be 0 hours it can be seen that the vulnerable period is reduced to a fraction of the present standard six months. It can be argued up to a point that we effectively gain a ninth generating set.

4.5 High Speed interim Solution- Events in May lead us to initially decide to carry out enabling works on our High Voltage system this summer. This was to allow high speed units to be flown in to recover from the inevitable failure. This would limit an event to days/weeks rather than weeks/months. Then engine number 6 failed. Convincing us that we needed the generating plant installed and in place. That fortune favoured us in that the damage was limited to the head and piston is a blessing unlikely to be repeated. Another winter with this present configuration is unlikely to be survivable and an ill-advised gamble. The interim option is clearly needed now. To that end we are securing global prices from three high speed generating set providers. In-house discussions have resulted in a recommendation of 3 x 2.0 MW sets. Given our reliability issues, it is more than likely that this interim station may have to run continuously. With this scenario in mind, we are working on a solution for the thermal load at the swimming pool. We will not be offering any solution to the district heating system supplying the KEMH. The interim thermal solution will also supply heat to the existing engine hall to preserve this installation. A separate paper will be produced for this proposed interim solution but early indications are that the costs will be in the region of £2M to £2.5M. It is currently feasible to have this solution available by next winter but orders will need to be placed in the next couple of months and therefore funding allocated for 2016/17 may need to be brought forward to this financial year (a request to do so would be contained in the further paper).

4.6 Stores location- The existing power station site has poor storage options which cannot be added to as they are at present overwhelmed and not fit for purpose. A new storage facility is required to accommodate item 3 and we feel it is currently best placed at the preferred new power station location which is to the South of the FIPASS/Airport Road Junction.

5.0 Financial Implications

5.1 Funding of £2,000,000 was originally made available within the 2014/15 financial year. The interim solution has taken some time to confirm and therefore to date only a small proportion (less than £100) of this funding has been spent on design costs.

5.2 During the 2015/16 budget process the funding was amended and reallocated with £1,000,000 being available in 2015/16 and a further £4,000,000 being made available in 2016/17. Therefore a total of £5M has been allocated (including the 2014/15 funding).

5.3 Cost estimates have been requested. To date we have received materials costings for the building estimated at £ **REDACTED**. No estimates have yet been received for the infrastructure works. These will include erection of the building, ground works and base slab and construction of a suitable access road. The estimate made by PWD design office is £ **REDACTED** for the groundworks and erection of the building and £ **REDACTED** for the construction of the access road.

5.4 The Power & Electrical department are currently still working on the required spares package and therefore there are currently no costings available. However it is estimated that for the full spares package it will cost £ **REDACTED**.

5.5 As the funding has been redistributed over the next two years £400,000 will need to be released early to allow the completion of the works.

			2015/16	2016/17	Total
Current Budget Approvals					
0957 3235			1,000,000	4,000,000	5,000,000
Total			**1,000,000**	**4,000,000**	**5,000,000**
Proposed budget					
0957 3235			1,400,000	3,600,000	5,000,000
Total			**1,400,000**	**3,600,000**	**5,000,000**
Capital Budget amendment required			400,000	(400,000)	-

5.6 Any further submission will be made for the high speed generator solution which may require an additional £2M to £2.5M to be brought forward from the 2016/17 to this financial year.

6.0 Legal Implications

None.

7.0 Human Resources Implications

None for the purposes of this paper.