



KIDSTON PUMPED STORAGE HYDRO PROJECT - LESSONS LEARNT REPORT

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	3
2. LESSONS LEARNT IN RESPECT TO OWNER	3
2.1 Oaks Rush Construction Camp Expansion	3
2.2 Securing Power During Construction.....	3
2.3 Communications	4
3. LESSONS LEARNT IN RESPECT TO THE EPC CONTRACTOR.....	4
4. BALANCE OF PLANT (D&C CONTRACTOR).....	5
5. POWERLINK CONNECTION ASSETS.....	5
6. OVERALL PROJECT COST STATUS.....	5



1. EXECUTIVE SUMMARY

Genex Power Limited (**Genex, Company** or **Owner**) is the 100% owner and developer of the Kidston Clean Energy Hub, located in North Queensland (the **Kidston Hub**). Stage 1 of the Kidston Hub was completed in the form of the 50MW Stage 1 Kidston Solar Project, which was energised in November 2017. Stage 2 of the Kidston Hub is the 250MW Pumped Storage Hydro Project (**K2-Hydro** or **Project**) which is currently under construction, having reached financial close in May 2021. A further Stage 3 of the Kidston Hub, being a wind project of approximately 150MW, is currently in feasibility stages along with a potential co-located solar farm of up to 270MW.

This Lessons Learnt Report will aim to provide a detailed analysis on the Project cost and time movements to date and how these could potentially be mitigated in the future.

2. LESSONS LEARNT IN RESPECT TO OWNER

2.1 Oaks Rush Construction Camp Expansion

The Oaks Rush Accommodation Camp (the **Camp**) has been expanded to accommodate 450 beds and the main facilities have undergone a significant upgrade to facilitate this expansion. There are a number of lessons learnt with respect to these works largely as a result of renovating existing infrastructure. Key lessons learnt are provided below:

CAMP EXPANSION INFRASTRUCTURE: The early purchase and mobilisation of second hand camp units (four ensuited rooms per 12m x 3m accommodation block) has proven to be a significant benefit for the Project both in terms of cost (purchase price significantly less than new built) and time (minimal time to refurbish the units compared to new built). The decision to construct the camp to full capacity at Project commencement has allowed additional persons to stay at the camp to what was originally forecasted.

THE CAMP FACILITY: The refurbishment of the Camp facility has uncovered expected shortfalls with the existing building. A number of unplanned additions/variations were required to ensure that the building was refurbished to meet current legislation and building codes. This mainly focussed on electrical, structural and code compliance items. Further to this, there were services strikes during the upgrade to the Camp facilities whilst undertaking below ground works. Despite desktop searches and vacuum excavation being used to locate services at intervals, such strikes occurred due to the variability of existing services installation in terms of depth and location in plan. Lesson learnt would be to utilise vacuum excavation techniques for all excavation for high-risk services, not just as a means to pot hole for positive identification.

2.2 Securing Power During Construction

The pre Financial Close (**FC**) approach to connecting to the Ergon Energy network (**Ergon**) to provide construction power (8MVA demand) was considered relatively straight forward at that time. Since financial close, the connection with Ergon has been very complicated, primarily due to the condition

of the existing electrical system with their distribution network. This is further compounded with a shortfall of Ergon employees available to design and undertake the works due to other projects ongoing on their existing network. Nevertheless, Genex has been working collaboratively with Ergon to overcome these challenges and provide a two-stage approach for providing power to the Project, initially with 4MVA and then the full 8MVA which is required for the construction period of the Project. Genex has installed a diesel generator and transformer system to provide electricity locally to the Project whilst the Ergon connections are made. The lesson being, further due diligence works in response to connection queries prior to financial close may have reduced timeframes and cost for the electrical connection.

2.3 Communications

The provision of high capacity (140MBS) communications with respect to internet and mobile coverage has been instrumental to ensuring the Project workers wellbeing in the Camp is maintained by having good communications to call family and friends. The communications system comprises of a microwave link from two independent sources (Mt Fox and Greenvale) which provides a level of redundancy with the Telstra service. The use of Voice Over Internet Protocol has allowed the internet bandwidth to be used for phone calls. This has assisted communications whilst the Optus Small Cell infrastructure was installed and commissioned. Delays to the Optus Small Cell were encountered due to Covid-19 restrictions at their Belrose facility in NSW.

3. LESSONS LEARNT IN RESPECT TO THE EPC CONTRACTOR

The key lessons learnt for the Engineering, Procurement and Construction (**EPC**) Contractor are provided below:

- Early mobilisation and acceleration of program critical items has allowed the EPC Contractor to maintain the program despite any setbacks with respect to logistics, supply of items, availability and breakdown of key plant and the remoteness of the Project in terms of availability of personnel and Covid-19 related restrictions for travel interstate;
- Trial works for the Wises Dam have resulted in unforeseen conditions being encountered resulting in minor amendments to the dam design. The geotechnical investigations did not fully identify these unexpected conditions. The importance of design and construction working together to ensure an optimum design is working well and the minor modifications to the design were completed in an appropriate timeframe;
- The provision of an electrical reticulation system including earthing has been delayed due to supply lead times for key electrical compounds. A number of electrical works on the Project are taking longer than expected due to supply constraints. Temporary measures with diesel generators are also assisting EPC Contractor in mitigating delays caused by lack of power to the Project; and
- Design progression was initially behind program but has recently accelerated to align with original Project program expectations. This is not uncommon at the start of any major project until a

number of key decisions/design inputs are made. Continued focus on design delivery and quality of design remains a key priority for the Project.

4. BALANCE OF PLANT (D&C CONTRACTOR)

The Balance of Plant works relating to the two switchyards, 22kV distribution line and a section of 275kV transmission line between the two site switchyards are progressing in line program expectations.

The key lessons learnt relate to the Ergon connection for construction power supply and the interface with the 22kV distribution line. The 22kV distribution line work was brought forward to allow a portion of the line to be used for site distribution for the Owner supplied generator system provided (whilst the Ergon connection is made). The network was also expanded to include connections for the EPC Contractor via an overhead network as compared with underground services originally planned. This has reduced below ground works onsite. This is an important consideration as some of the areas are constrained with the to be installed Project infrastructure.

5. POWERLINK CONNECTION ASSETS

The Powerlink works comprise the circa 186km 275kV transmission line from Kidston to Mt Fox. To date, Powerlink have been primarily focused on the design and approvals aspect of their program. The approval works are running to schedule with key submissions lodged. The dedication of an approvals manager has been instrumental in ensuring approvals do not impact the Project schedule.

6. OVERALL PROJECT COST STATUS

The Project has a total development cost of \$775.5M. This amount includes the core Project EPC costs, the Project's contribution towards the capital cost of the new 186km transmission line from Kidston to Mount Fox, the surface connection assets at Kidston, other costs associated with the construction program for the Project and costs associated with the financing. An overview of the capital costs is shown in the table below:

Table 1: Overview of key Project costs

CATEGORY	PRICE (\$M)	PERCENTAGE
EPC Price	\$478.2	62%
Transmission	\$110.9 ¹	14%
Connection Assets	\$25.9	3%
Other Costs	\$79.1	10%

¹ This excludes the \$147.3M contribution from the QLD State Government contracted direct to Powerlink Queensland.

Contingency & Finance Costs	\$81.4	10%
TOTAL Project cost	\$775.5	100%