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4 September 2019

Grant Benvenuti,
Manager Market Operations
Electricity Authority
Wellington
(by e-mail: marketoperations@ea.govt.nz)

Dear Grant

Re: **Application for the Kapuni Energy Joint Venture to be classed as Category A co-generation status**

The Kapuni Energy Joint Venture (KEJV) is an unincorporated joint venture between Vector Kapuni Limited (Vector) and Nova Energy Limited (Nova). Nova, on behalf of the KEJV, is seeking for the KEJV to be classed as a type A industrial co-generating station under Schedule 13.4 of the Electricity Industry Participation Code.

The KEJV co-generation plant is based at the Vector Kapuni Gas Treatment Plant (KGTP) and supplies steam to the KGTP plus a plant associated with the dairy industry; and electricity to those customers and another embedded site. Excess electricity generated is exported to the grid.

Electricity is generated by four generation units:

- Two 10MW gas turbines and associated heat recovery steam generators located at KGTP,
- One 1.5MW back-pressure steam turbine at KGTP letting down HP steam to MP steam pressure for industrial use, and
- One 2MW steam turbine located at the dairy site, letting down HP steam to LP steam pressure for industrial use.

97% of the electricity is produced by the gas turbines, which are designed to run continuously at capacity. Around 80% of the net electricity generated is exported to the grid at KPA1101. KPA1101 is connected by a single 110kV circuit to the Transpower line between Stratford and Opunake.

Operating the gas turbines at maximum output is the most efficient mode. In this mode electricity exports are determined by:

- electricity demand by the embedded electricity users,
- steam demand by the industrial processes, and
- the ambient air conditions (affecting plant efficiency).

Steam demand is independently determined by the industrial demands, with the output of the steam turbine at KGTP ranging between 0 MW and 1.5 MW depending on MP steam demand. The steam turbine at the dairy site only operates when the demand for LP steam is above a minimum level, and then operates at up to 2 MW.

Electricity and steam demand at the dairy site have hourly, daily and seasonal variability, peaking in spring. Steam demand drops to zero for a winter shut-down and maintenance period. The KEJV also plans its maintenance shut-downs for its gas turbines in June for this reason. The steam demand from the KGTP is determined by the volume of untreated gas supplied by the operator of the Kapuni gas field.

Excepting the dairy winter shut-down and maintenance outages on the gas turbines, the normal operating mode is to run both gas turbines base load at full output, with steam turbine output being determined by the LP and MP steam demands at the industrial sites.

Generation offers for the KEJV co-generation plant are therefore simply forecasts of the expected gross generation, less the embedded electricity demand. Due to the unpredictable variability of embedded steam turbine output and embedded electricity user demand, the gas turbine output sometimes needs to be backed off to keep within the 1MW dispatch tolerance. This is clearly inefficient in terms of the operation of the KEJV co-generation plant.

Allowing the KEJV to operate as a type A co-generator will give Vector, as plant operators, and Nova, as Trader, increased flexibility to both manage the plant efficiently and meet the market requirements.

Yours sincerely

Paul Baker

Commercial & Regulatory Manager

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