






## Register of Completed Embedded Generation Projects



INFORMATION	GENERATOR 1	GENERATOR 2	GENERATOR 3	GENERATOR 4	GENERATOR 5
Technology of the Generating Unit(s), including make and model	36 x 11kV Diesel Synchronous Generating Units  Model: Cummins with Stamford PE734G alternator	18 x 415V Diesel Synchronous Generating Units  Model: Cummins with Stamford PE734G alternator	30 x 415V Diesel Synchronous Generating Units  Model: Cummins with QSK60 alternator	1 x 11kV Natural Gas Co-Generating Unit  Model: SOLAR TITAN 250	3 x 11kV Natural Gas Co-Generating Unit  Model: GE Jenbacher with AvK DIG 142 alternator
Maximum power generation capacity of all embedded Generating Units	65.0MW	21.0MW	50.0MW	21.7MW	7.2MW
Contribution to fault levels	At 66kV Connection Point  3-phase = 1.7kA  Ph-Ground = 0.8kA	At 11kV Connection Point  3-phase = 3.5kA  Ph-Ground = 2.4kA	At 33kV Connection Point  3-phase = 4.2kA  Ph-Ground = 1.6kA	At 11kV Connection Point  3-phase = 11.6kA  Ph-Ground = 0.4kA	At 11kV Connection Point  3-phase = 3.0kA  Ph-Ground = 1.7kA
Size and rating of relevant transformers	2 x 11/66kV  40.5MVA	18 x 0.415/11kV  1.5MVA	18 x 0.415/33kV  3.6MVA	2 x 33/11kV  30MVA	1 x 11/66kV  12.5MVA
Single line diagrams of the connection arrangement	 PDF	 PDF	 PDF	 PDF	 PDF

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Protection systems and communications systems	<p>Protection Systems:</p> <ul style="list-style-type: none"> <li>• Inter-trip scheme to prevent islanding</li> <li>• Permissive interlocks</li> <li>• Generator Dispatch Limiter</li> <li>• Generating System Under/Over Frequency</li> <li>• Generating System Under/Over Voltage</li> <li>• Voltage Unbalance</li> <li>• Synchronisation</li> <li>• Pole Slip</li> </ul> <p>Communication Systems:</p> <ul style="list-style-type: none"> <li>• Fibre for inter-trip scheme and SCADA</li> </ul>	<p>Protection Systems:</p> <ul style="list-style-type: none"> <li>• Inter-trip scheme to prevent islanding</li> <li>• Permissive interlocks</li> <li>• Generator Dispatch Limiter</li> <li>• Generating System Under/Over Frequency</li> <li>• Generating System Under/Over Voltage</li> <li>• Voltage Unbalance</li> <li>• Synchronisation</li> <li>• Pole Slip</li> </ul> <p>Communication Systems:</p> <ul style="list-style-type: none"> <li>• Fibre for inter-trip scheme and SCADA</li> </ul>	<p>Protection Systems:</p> <ul style="list-style-type: none"> <li>• Inter-trip scheme to prevent islanding</li> <li>• Permissive interlocks</li> <li>• Generator Dispatch Limiter</li> <li>• Generating System Under/Over Frequency</li> <li>• Generating System Under/Over Voltage</li> <li>• Voltage Unbalance</li> <li>• Synchronisation</li> <li>• Pole Slip</li> </ul> <p>Communication Systems:</p> <ul style="list-style-type: none"> <li>• Point-to-multipoint radio for inter-trip</li> </ul>	<p>Protection Systems:</p> <ul style="list-style-type: none"> <li>• Inter-trip scheme to prevent islanding</li> <li>• Runback scheme to prevent overload</li> <li>• Permissive interlocks</li> <li>• Generating System Under/Over Frequency</li> <li>• Generating System Under/Over Voltage</li> <li>• Voltage Unbalance</li> <li>• Synchronisation</li> <li>• Pole Slip</li> </ul> <p>Communication Systems:</p> <ul style="list-style-type: none"> <li>• Parallel fibre and radio for inter-</li> </ul>	<p>Protection Systems:</p> <ul style="list-style-type: none"> <li>• Inter-trip scheme to prevent islanding</li> <li>• Permissive interlocks</li> <li>• Generator Dispatch Limiter</li> <li>• Generating System Under/Over Frequency</li> <li>• Generating System Under/Over Voltage</li> <li>• Voltage Unbalance</li> <li>• Synchronisation</li> <li>• CBF</li> <li>• Pole Slip</li> </ul> <p>Communication Systems:</p>

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			scheme and SCADA	trip scheme and SCADA	<ul style="list-style-type: none"> <li>Parallel fibre for inter-trip scheme and SCADA</li> </ul>
Voltage control and reactive power capability	<p>Power factor set point remotely controlled by SA Power Networks</p> <p>Voltage control deemed not required</p> <p>Generating System capable to operate between 0.80 supplying reactive power and 0.975 absorbing reactive power, measured at generator terminals.</p>	<p>Power factor set point verbally instructed by SA Power Networks</p> <p>Voltage control deemed not required</p> <p>Generating System capable to operate between 0.85 supplying reactive power and unity power factor, measured at generator terminals.</p>	<p>Power factor set point remotely controlled by SA Power Networks</p> <p>Voltage control deemed not required</p> <p>Generating System capable to operate between 0.9 supplying reactive power and unity power factor, measured at generator terminals.</p>	<p>Power factor set point remotely controlled by SA Power Networks</p> <p>Voltage control deemed not required</p> <p>Generating System capable to operate between 0.915 supplying reactive power and 0.995 absorbing reactive power, measured at generator terminals</p>	<p>Power factor set point remotely controlled by SA Power Networks</p> <p>Voltage control deemed not required</p> <p>Generating System capable to operate between 0.93 supplying reactive power and 0.96 absorbing reactive power, measured at generator terminals</p>
Details relevant to the specific location of the facility	Nil	Nil	Nil	Nil	Nil