



TAKING THE LOAD DOWN UNDER

The McArthur River Mine in the Gulf of Carpentaria, Northern Territory of Australia, is one of the world's largest providers of zinc in bulk concentrate form. Operated by McArthur River Mining Pty Ltd (MRM), a wholly-owned subsidiary of the international Glencore group, the mine produces approximately 3 per cent of the world's total zinc resources used by all types of smelters each year.

With the mine's processing plant scheduled to double in size from 2014, the need for a new power plant that could satisfy the load acceptance requirements of the mining process created the chance for Wärtsilä to showcase the benefits of its gas engine technology.

Electricity for powering the mine's operations is produced by a dedicated gas-fired power plant owned by global independent power producer Energy Developments Ltd (EDL). But with the long-term power purchase agreement due to expire soon, Glencore decided to issue a tender for a new

gas-fired power plant that could satisfy the new power requirements.

The tender for the Power Purchase Agreement (PPA) went out to a number of suppliers. Following a full technical evaluation, Wärtsilä's solution was shown to be the best technical and economical solution – offering the highest fuel efficiency and the lowest levelised cost of electricity over 20 years.

Under an equipment delivery contract, Wärtsilä supplied six Wärtsilä 20V34SG gas engines – including the engine hall, associated exhaust stacks, radiators, control system and related engineering services. The plant has a total output of 53 MW at site conditions. Wärtsilä also ensures reliable operation through a 10-year maintenance agreement. The agreement provides technical expertise and support as well as online condition monitoring and maintenance planning to ensure maximum plant availability.

There were several key benefits that attracted EDL to Wärtsilä's solution.



” Wärtsilä has an established track record of delivering high quality, and EDL was impressed by Wärtsilä's proposal to supply an efficient power plant solution on a fast-track basis. This was an important consideration in choosing Wärtsilä as our engine supplier for this project.”

*Shane McLaughlin,
EDL Executive General Manager, Project Delivery*



THE CHALLENGE	WÄRTSILÄ'S SOLUTION	BENEFIT
High ambient conditions (+45°C)	Proven reciprocating gas engines	High power output also at high ambient conditions
Large load acceptance requirements (12 MW ball mill)	Multi-engine plant	High plant efficiency over entire load range with no stop/start penalties and lower installed capacity due to high load acceptance capability
Interfacing with existing power plant	Smart proprietary control system interface	Customer can continue to use existing plant as emergency backup
Capability to use gases of varying quality	Wärtsilä's pure gas engines	Ability to operate on natural gases of varying quality

The plant is located in an area where temperatures can hit a scorching 45°C. This, together with demand for high fuel efficiency and lowest levelised cost of electricity, meant gas turbines were not even considered an option. Unlike gas turbines, internal combustion engines (ICEs) do not suffer significant derating at high ambient temperature. Also, the use of multiple units means the plant can follow load variations while maintaining maximum overall efficiency.

The expanded mine uses a ball mill – a large rotating mill containing steel balls for crushing and grinding rocks into a fine powder. The mill is driven by two electric motors each of 5750 kW capacity. Both the motors are started simultaneously to get the ball mill into motion. This high load acceptance requirement presents a demanding challenge for the gas engines in the power plant.

Raymond Vinton, General Manager, Sales Wärtsilä Australia Pty Ltd explained: "On a 12 MW ball mill with soft-starting capability, the starting current is typically 150% of the nominal current.

Powering a 12 MW ball mill at a scorching 45°C.

Wärtsilä gas engines have high load acceptance capability with numerous proven operating references."

Wärtsilä was able to demonstrate to EDL with software modelling and simulations that its gas engines were capable of meeting the stringent requirements of frequency and voltage drop during starting of the ball mill. The Wärtsilä 34SG is a four-stroke, medium-speed, spark-ignited gas engine that works according to the Otto process and the lean-burn principle. The efficiency of the Wärtsilä 34SG is one of the highest of any spark-ignited gas engines currently available.

"The technology we use to control our engines puts them streaks ahead of the competition," notes Vinton.

As an expansion project, the new digital controls had to be interfaced with the old analogue control systems of the existing plant – a task that EDL was confident Wärtsilä could execute based on its previous experience with Wärtsilä engines and control system.

Wärtsilä had worked with EDL in the past and proved it had the capability to manage and deliver projects on time and to budget. With a fast-track schedule of just 12-14 months, the ability to work to a tight deadline at McArthur River was an important consideration.

Once again, Wärtsilä proved it was able to honour its commitments resulting in a satisfied customer. With commissioning completed in early 2014, EDL can now provide reliable and low cost power to Glencore, which will help maintain its position as the number one zinc mining company in the world.



MAIN DATA

Customer	Energy Developments Ltd (EDL) (IPP)
Type	Wärtsilä 34 gas power plant
Operating mode	Baseload
Gensets	6 x Wärtsilä 20V34SG
Total output	53 MW
Fuel	Natural gas
Scope	EEQ (Engineering & Equipment)
Delivered	2014

