New energy efficiency programme for the New Zealand quarrying industry

Business analysts say that reducing fixed costs should be the number one tactic for companies in tough economic times. Quarrying is an energy intensive sector, with energy making up as much as 21% of total cost of supplies (excluding labour). Any savings that can be made on energy costs go straight to improving the bottom line.

A new project has been started recently by the Aggregate and Quarry Industry Association (AQA) to help members reduce their energy costs and improve performance. The project has been developed in partnership with the Energy Efficiency and Conservation Authority (EECA).

In 2007 it was estimated that the energy demand of the non-metallic minerals sector in New Zealand was 6.3 petajoules (PJ) of energy. This represents 4% of New Zealand's total industrial energy demand, and does not even include liquid fuel use (by quarry vehicles for example).

The AQA Best Practice Energy Programme is providing a practical way for aggregate and quarry companies (including lime quarrying) to drive down their energy costs. It offers half-price energy audits, delivered by high quality auditors with experience in the sector.

For a relatively small initial investment in an energy audit, companies have been finding savings averaging more than 10% of their energy costs. Some New Zealand quarrying operations have found potential energy savings of as much as 20% of their total annual energy spend.

An energy audit involves a fully qualified and experienced energy auditor visiting a site to review how and where energy is being used in a company's operations. The auditors then look for practical opportunities to improve the efficiency of the plant and associated services. In some cases onsite vehicles are also examined to look for opportunities to improve fuel efficiency.

A recent energy audit of a New Zealand quarry found that two pumps supplying water to a process water reservoir were working too hard and supplying water at such a high rate it was overflowing the reservoir and flowing to a sump requiring further pumping. This meant the water was being unnecessarily pumped twice. The auditor's solution was to install a VSD on one pump together with a PID level control system that utilises an ultrasonic level sensor in the reservoir. This will speed regulate the pump motor as required to maintain a constant level in the tank.

Implementing the whole system cost $30,000 leading to savings of $25,300 in energy costs every year, giving a simple payback of 1.2 years.

EECA has recently published a case study of Winstone Aggregates' review of the efficiency of their vehicle fleet. By implementing some simple changes such as reducing idling times, covering loaded and unloaded trucks, installing speed limiters and

improving tyre management the company is on track to save 10% of their annual fuel bill, read the full case study at http://www.eecabusiness.govt.nz/node/10983 .

In addition to coordinating half price energy audits for members, the Best Practice Energy Programme is working on other ways to help the quarrying industry adopt energy efficient practices, including benchmarking and industry training.

An energy audit of a South Island quarry operation found that the quarry was being heavily penalised by Congestion Period Demand charges. The auditors recommended installing a warning system to enable load reduction during these periods. Loads could be reduced during these times by utilising material stockpiles while some machinery is switched off.

Installing a timed alarm connected to a ripple relay to enable this peak load shedding will cost the company $1,500 for potential annual savings of $10,721.

The programme has started investigated the potential usefulness of a tool that will enable New Zealand operators to benchmark their energy performance against other companies. By examining a quarry's energy use per tonne of material produced it is possible to identify poor performance and the need to review efficiency.

There is a wide range of material produced by the industry and it is clear that the amount of energy used depends on the finished product and the level of processing involved. The table below shows the wide range of energy performance in the industry. Any benchmarking tool developed for the industry would need to compare apples-with-apples by having appropriate benchmarks for different materials or processes. This is something the AQA programme is working on.

	Energy Performance Indicator	**Country**
Aggregate	6-139 kWh/tonne	UK
Recycled aggregate	28-111 kWh/tonne	UK
Limeworks	2,000 kWh/tonne	Canada
Various NZ quarries	0.7-12.6 kWh/tonne	NZ (limited data)

Training of industry operatives is also a good way to help quarry companies to address energy efficiency. By integrating energy efficiency into industry training it may be possible to help quarry staff continuously look for energy efficiency opportunities and ensure that energy efficiency is business-as-usual.

The AQA wants the Best Practice Energy Programme to be as useful and relevant to member companies as possible. The AQA would welcome the feedback of operators on

what they would like to see as part of the programme that would really help to implement efficiency gains.

If you have any ideas, or would like to find out more about the Best Practice Energy Programme you can contact the AQA programme coordinators: Simon Wilkinson 021 944992 or Ket Bradshaw 021 369495.