

# Going all-electric can save energy, time and money

Improved energy efficiency is just one of the reasons why Monaghan Plastics & Engineering is in the process of switching to all-electric injection moulding machines.



Plastic sleeves for office furniture made by Monaghan Plastics

The Auckland-based company is so impressed by the machines that, despite costing 10 to 15% more than traditional hydraulic-powered machines, they've already replaced half of their old machines with all-electric models.

According to the company director, John Fowler, Monaghan Plastics hasn't been put off by a recent monitoring project carried out for the Energy Efficiency and Conservation Authority (EECA) which showed that the new machines aren't always as energy efficient as the manufacturers claim.

The monitoring project found that energy savings were relatively small when the machines were used to make products with short cycle times, but quite substantial when the cycle times were longer.

John Fowler says that, overall, the all-electric machines are more energy efficient than hydraulic machines.

"We have an eco-policy, and any energy saving is good," he says. "It's not just about global warming – being green saves the company money, because you use less power."

The machines have other advantages, too. They are less noisy – "that creates a more pleasant environment for our staff" – and, more importantly, they consistently produce better quality products. That helps save more money, because there is less wastage.

John Fowler says it is the combination of these three factors which makes them an attractive alternative to the cheaper, hydraulic-powered machines.

"We're sold on the idea of them. Five of our 10 injection moulding machines are now all-electric and we'll eventually buy more."

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## Putting the machines to the test

Monaghan Plastics bought its most recent all-electric moulding machine, a \$125,000, 80-tonne model, with the help of an EECA Energy Intensive Businesses grant.

It was one of three Auckland plastics companies which received EECA grants to replace older-style hydraulic machines with all-electric versions. The others were two unrelated companies, Tru Design Plastics Ltd and Tru-Test Ltd, neither of which had bought an all-electric machine before.

“We had looked at them quite seriously but the price variation between them and the standard machine was too big,” explains Tru Design’s general manager, Robert Michael. “Then we needed to replace another one of our old machines, and the EECA grant meant we could try out one of the new ones without spending the extra money.”

All three companies produce high-end components for the health, agricultural and marine industries.

According to the manufacturer’s claims, all-electric machines use up to 65% less energy than hydraulic-powered machines.

However, a monitoring project carried out for EECA by Energy NZ found that energy savings varied significantly, depending on the cycle time of the product being run and the type of hydraulic machine it replaced.

The monitoring compared the amount of energy needed to produce a component using an all-electric machine with the amount needed to produce the same component using a hydraulic machine. Both machines used the same die and ran continuously for the same length of time.

The monitoring found that an all-electric machine used just 9% less energy to make a medical clip with a cycle time of 24 seconds. However, the savings were much higher – 78% – when making an electric fence insulator with a cycle time of 45 seconds.

Estimated annual power savings ranged from \$133 to \$6,709.

The monitoring report says that cost savings would have been higher if the companies’ peak line charges were based on kVA values, as they are in many places in New Zealand, rather than the kW values used at the three sites.

Product	Electric fence insulator	Milk machine part	Medical clip
Cycle time	45 secs	35 secs	24 secs
Running time	15 hours	4 hours	24 hours
Energy use: Hydraulic	234kWh	42.48kWh	61.68kWh
All-electric	51.9kWh	25.28kWh	56.4kWh
Estimated annual savings	\$6,709	\$1,127	\$133

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## Why does cycle time affect energy efficiency?

The energy savings come during the 'down time' in each cycle, when the injector stops moving to allow the plastic product to cool and be removed from the mould.

For low-quality products such as ice-cream containers, this process takes only a few seconds and the injector is moving almost continuously. However, for some high-quality products, the cooling process can take as long as two minutes.

All-electric machines use much less energy during this down time than their hydraulic counterparts. That means the longer the cooling cycle, the more energy is saved.



Setting up production on the all-electric injection moulding machines

## Extra benefits

All three companies have found the new machines have other advantages apart from energy efficiency. In particular, they produce better quality products more efficiently. That means less wastage and shorter run lengths.

"We've definitely found the new machine is more accurate and there are fewer rejects," says Robert Michael of Tru Design. "We're starting to see it in the run lengths – they're more like two-and-a-half weeks, rather than three."

He points out that even a small reduction in wastage can save substantial amounts of money.

Tru-Test's manufacturing manager, Darcy Sheffield, agrees. He says that as well as producing consistently better products, the new machines are also quieter and cleaner than the hydraulic models.

"There's a tremendous amount of noise reduction, which improves the working environment for our staff. We also value the benefits to the environment through less energy usage and wastage."

Mr Sheffield says the improvement means Tru-Test is likely to buy more all-electric machines in order to produce superior products for customers at the lowest possible cost.

However, Robert Michael is slightly less sure.

"When it comes to replacing the next machine I'd probably get an all-electric one," he says. "It would just depend on what size it was, and what we were planning to do with it."

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**At work on the all-electric injection moulding machine**

### EECA grants

Grants for demonstration projects are available to businesses in energy intensive sectors. EECA will pay for up to 40% of the capital cost of the project, with a maximum of \$100,000 for each grant. EECA is looking to support energy efficient technologies that are commercially available but not yet commonplace in New Zealand.

EECA grants are available for businesses from the following sectors: heavy transport fleets, wood processing, basic metals, glasshouse crops, irrigated dairying, irrigated arable crops, food and beverage processing, fishing fleet operations and non-metallic products.

Other businesses where energy is greater than 5% of their total business costs are also eligible.

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#### CONTACT EECA

For more information on EECA's technology grants and services, call 0800 358 676 or visit [www.eecabusiness.govt.nz/eib](http://www.eecabusiness.govt.nz/eib)