

Do Energy Efficient Pool Pumps benefit consumers?

Dr Martin Gill

The cost of running pool pumps can exceed \$700 a year. Choosing an energy efficient pool pump should significantly lower this cost. Unfortunately not all consumers will see savings because evidence shows smart meters can significantly overestimate the energy use.

Introduction

Over 1.1 million Australian households have a pool or spa pump. The daily filtering required to keep the pool in good condition can add over \$700 to annual electricity bills. Upgrading to an energy efficient pool pump should significantly lower this cost.

Unfortunately there is a problem. Energy efficient pool pumps often use electronic controllers to lower pump energy use. Laboratory testing shows when modern smart meters are used to measure the electricity use of these pumps, errors can be up to 500% too high!

The result is while the pumps use less energy, electricity meter errors may actually increase consumer electricity bills!

Energy Efficient Pumps

Government energy efficiency initiatives have successfully lowered Australian electricity use. One visible Government initiative is the energy labelling scheme. In the past labelling of pool pumps was only voluntary, however new rules were introduced in 2018 making the labelling of pumps mandatory.

From 2020 pool pump manufacturers will be required to fit a label showing the pump's energy efficiency. The more stars shown on the label, the less electricity the pump uses and ideally the lower running costs.



In theory consumers can use the labels to quickly compare different pool pumps leading to more energy efficient choices. Unfortunately many of the almost 100,000 pool pump purchases made each year are emergency replacements. At that time consumers are

less interested in the energy rating and more interested in when it can be installed!

So in a separate initiative the Government has decided to specify Minimum Energy Performance Standards (MEPS) for pool pumps. MEPS removes inefficient pool pumps from the market, thereby ensuring replacement pumps are more energy efficient.

Similar initiatives have seen the energy efficiency of domestic air-conditioners improve by almost 50%.

Annual Savings

The star rating shown on the label is based on the energy use of the pump as measured in accordance with Australian Standard AS5102 [Ref 1]. The laboratory measurements are then used to estimate annual energy consumption. Pumps using less energy receive a higher star rating and (in an ideal world) should result in lower annual running costs.



The above calculations show replacing a 1 star pump with a 9 star pump should save pool owners \$608 a year. In most cases the savings recover the slightly higher cost of the more energy efficient pump in only a couple of years.

Of course the above calculations assume the electricity meter *accurately* measures the energy use of the pump. Recent testing suggests this is not the case.

Modern Smart Meters

Over the next 10 years all Australian homes will have their existing electricity meter replaced by an electronic smart meter. These smart meters use a computer to calculate electricity use. Consumers

moving from an old electro-mechanical (spinning disk) meter to a modern smart meter often find their electricity bills increase. Utilities often attempt to justify the increase by claiming (without proof) the old meter was under recording. Utilities assert the new smart meter passes all the accuracy tests despite an increasing body of evidence suggesting current meter testing is inadequate [Ref 2].

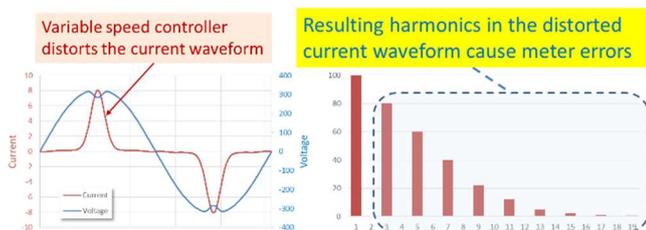
Unfortunately for consumers laboratory testing reveals large measurement errors when electronic smart meters are used to measure the electricity use of modern household appliances, including light dimmers [Ref 3], solar diverters and more recently pumps [Ref 4].

Relevance to Energy Efficient Pool Pumps

The laboratory measurements presented by Bas ten Have et al [Ref 4] were the result of a consumer complaint. After installing a variable speed pump they observed higher energy readings on their electricity meter.

The laboratory testing connected the pump to a range of modern meters typically used to measure domestic electricity consumption. They then operated the pump and compared the readings on each meter. Ideally the readings should all be within the claimed accuracy of the meters, or around 1%. Instead the testing revealed measurement differences between the various meters exceeded 500%!

The pump tested by Bas ten Have et al was a small variable speed pump. They observed the variable speed controller distorted the current waveform, with the resulting harmonics created by this distortion ultimately causing the measurement errors.



The result of the testing is significant. Virtually all the energy efficient pool pumps listed on the Energy Ratings website offering 8 or more stars use variable speed pumps [Ref 5].

The concern is while these energy efficient pool pumps use less electricity, meter measurement errors could actually result in consumers paying more.

Further Implications

Variable speed controllers are increasingly being used in a wide range of consumer appliances. All appliances containing a motor may employ a variable speed controller to lower their energy use. This includes pool pumps, fridges, air-conditioners, washing machines, clothes dryers, heat pump hot water heaters, fans and dishwashers. All these appliances should be considered likely sources of harmonics. That these harmonics subsequently lead to large measurement errors and higher electricity bills is deeply concerning.

Conclusion

The installation of energy efficient pool pumps can significantly reduce the amount of electricity consumers use to maintain their pools. This is an excellent outcome and the Government should be commended for supporting initiatives leading to greater uptake of energy efficient pool pumps.

Disappointingly reports showing large measurement errors when modern meters are used to measure the electricity use of energy efficient pumps mean installing an energy efficient pump may not lower consumer electricity costs.

This major failure lies squarely at the feet of Australia's Energy Regulators who choose to ignore the increasing body of evidence electronic meters are unable to accurately measure modern domestic appliances. The situation is totally unacceptable and needs to be urgently addressed.

Comments or Questions?

The author is happy to receive comments or questions about this article. He can be contacted at martin@drmartingill.com.au

Citation

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About Dr Martin Gill

Dr Martin Gill is an independent consultant specialising in the provision of consumer advice. This advice is based on a deep understanding of Australia's energy industry and strong analytical skills. As a consultant he has prepared advice for consumer advocates, government regulators, electricity distributors, electricity retailers, asset operators and equipment vendors.

Dr Gill is a metering expert. During the National Smart Metering Program he facilitated the development of a specification for Australian smart meters. Innovative metering products developed by his teams have been externally recognised with the Green Globe Award, NSW Government's Premier's Award and Best New Product by the Australian Electrical and Electronics Manufacturers Association.

He currently represents the interests of consumers on a range of Standards Australia working groups including metering, renewable power systems, battery storage and demand management.