

Water for Profit

PUMP EFFICIENCY: FACTORS AND COSTS



Pumping costs are a major factor in determining the profitability and efficiency of an irrigation system. Good irrigation scheduling and high application efficiency can significantly reduce the energy bill.

Factors influencing cost of pumping

The major factors that influence the cost of pumping per volume are:

- pumping plant efficiency and
- total dynamic head (TDH), which is the total hydraulic resistance against which the pump must operate.

Bore efficiency is also a factor, but it is largely determined by design and construction factors that were used during the drilling and development processes. Little can be done to improve the efficiency of a poorly constructed bore.



Pump efficiency

Performance evaluations indicate that irrigation pumping plants often use about 40 per cent more fuel than if a properly sized, adjusted and maintained pumping plant were used. Obviously, some are much worse and others much better.

Causes of pump inefficiency and excessive fuel use include:

- poor pump selection to match pressure, discharge and speed requirements
- pumps out of adjustment or worn out due to wear
- improperly sized engines or motors resulting in poor pump efficiency
- engines in need of maintenance and/or repair
- gear head pump drives that don't fit the load and speed requirements of the pump and engine.

Diesel vs. electric motors

Diesel and electric motors have different energy costs. The age of the pump also affects the cost of pumping. Below is a table that outlines the cost of pumping for diesel and electric pumps at different stages in their operating life based on a pump efficiency of 70 per cent.

Pump Type	Pump Age	Pumping Cost/psi	Pumping Cost/m Head
Diesel	New	\$0.48/ML/psi	\$0.69/ML/m
	Old	\$0.59/ML/psi	\$0.84/ML/m
Electric		\$0.35/ML/psi	\$0.50/ML/m

** Assuming electricity costs = 10c/kWhr; diesel costs = 46c/L; pump efficiency is 70%.*

For more details contact Growcom on 07 3620 3844.

Disclaimer: This information is provided as a reference tool only. Seek professional advice for irrigation specifics.

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