

Case Study: Electrification in Agriculture

Switching a Diesel Irrigation Pump to Electricity to Cut Energy Costs

Summary

Connecting electric irrigation pumps to the local electricity distribution network can be a cost-effective option with attractive payback times, while reducing reliance on fuel supply.

Grid electricity is also increasingly sourced from renewables. When combined with an on-farm solar system, an electric pump can significantly reduce emissions compared to a diesel alternative.

This case study shows how one farmer transitioned from a diesel bore pump to an electric solution.



Background

A farmer in the Narrabri area was using a direct-drive diesel pump to irrigate cotton around the clock for nine months of the year. They wanted to reduce operating costs and maintenance, and began considering a grid-connected electric pump supported by solar.

As diesel costs increased and fuel supply became less predictable, the business case strengthened. Rising costs helped shorten the payback period, while supply uncertainty increased risk and reinforced the value of a reliable electricity connection.

Discussions with a solar system supplier led to the involvement of Essential Energy.

An assessment of the nearby overhead electricity network found that a two-kilometre extension was required to connect a new transformer at the pump site.

As limited network augmentations were needed, connection costs were relatively low. This, combined with ongoing energy cost savings from electrification, resulted in a short payback period and greater certainty of energy supply.

FAST FACTS: REPLACING DIESEL PUMP WITH NEW GRID CONNECTION TO ESSENTIAL ENERGY NETWORK AND NEW 250KW ELECTRIC BORE PUMP PLUS 200KW SOLAR PV SYSTEM

Diesel Consumption Reduced by	429,000 litres per year
Electricity Consumption Now Used For Pumping	1,624,000 kilowatt hours per year
Operational Cost Savings	\$340,000 per year - a 52% reduction
Payback Period	2.4 years
Emissions Reduction	624 tons CO _{2e} per year - a 43% reduction

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Journey

- The farmer contacted a solar system supplier
- Essential Energy collaborated with the farmer to explore grid connection options
- A coordinated approach was adopted between all parties
- This included the farmer, pump supplier, solar system supplier, Essential Energy's electrification team and an Accredited Service Provider ASP
- The team designed a practical and cost-effective solution
- The project is now ready for implementation

Solution

- Extend existing overhead powerline by two kilometres
- Replace the diesel pump with an electric pump
- Install a local solar PV system behind the meter to offset daytime consumption

Connection costs and payback periods vary depending on site conditions. Key factors include the distance to the existing electricity network and the level of augmentation required to supply sufficient electric capacity to the pumping station.

In areas with multiple nearby pumping sites, there may be opportunities to share network augmentation costs. This can improve overall project value.

Takeaway Points

- ✓ Assess whether your diesel pumps could be connected to the grid
- ✓ Check the proximity/availability of the existing electricity network in the area
- ✓ Engage early with Essential Energy's Electrification team
- ✓ Understand potential network connection costs and savings
- ✓ Consider sharing network connection costs with other nearby irrigators
- ✓ Develop a simple business case to guide decision-making

Outcomes

- ✓ Reduced need for fuel deliveries and storage, as regular tank refills are no longer required
- ✓ Reduced and/or eliminated maintenance tasks
- ✓ Greater efficiency, with improved control and oversight of the pump via remote monitoring and automation
- ✓ Lower and more stable energy costs
- ✓ Reduced emissions, contributing to better sustainability and environmental performance

FOR MORE INFORMATION

- Our Electrification team can help assess your situation, please contact us:
 - Email: electrification@essentialenergy.com.au
 - Visit essentialenergy.com.au/electrification or scan the QR code

