The Electric Edge

Summary of the energy, cost and carbon benefits of electric concrete pumping.

Lendlease's Watermans Residences (R3) project is our first fossil fuel free construction pilot project.

When constructing the 30-storey tower at One Sydney Harbour, Lendlease deployed electric machinery and equipment where options were available. This included a concrete pump, two tower cranes, two hoists, elevated work platforms and a formwork hoist resulting in up to 94% of the energy powering construction activities coming from fossil fuel free sources.

Advantages of electric concrete pumping

Concrete pumping is a traditionally diesel-intensive activity. Electric concrete pumps, exemplified by the Schwing SP 3800 E supplied by Azzurri Concrete, showed compelling energy, carbon and cost advantages over diesel pumps, including:

67% less energy used, only one-third of diesel equivalent.

Zero emissions with renewable electricity.

59.1% reduction in energy costs due to enhanced operational efficiency.

50.8% cheaper overall, factoring energy and carbon costs for carbon neutrality.

↓ lower total cost of ownership than diesel equivalent.

Energy Efficiency

The electric concrete pump achieved a 67% reduction in energy consumption, using only one-third of the energy per cubic meter of concrete poured compared to its diesel equivalent used on a neighbouring Lendlease building.

Emissions Reduction

Electric concrete pumping produced zero emissions as construction of One Sydney Harbour is powered by renewable electricity. If powered by grid electricity, it led to a 12.9% reduction in gross carbon equivalent emissions (CO_2-e) per cubic meter of concrete pumped.

Cost Effectiveness

Not only did electric concrete pumping slash energy costs by 59.1%, but it also proved 50.8% cheaper overall when factoring in carbon costs for addressing residual Scope 1 and 2 emissions to achieve neutrality; something that Lendlease Construction is committed to.

This cost advantage arises from reduced energy demand, despite renewable electricity being twice as expensive as offsetting diesel emissions through purchasing carbon credits, positioning electric concrete pumping as a financially viable option.

Lifetime Costs

A Total Cost of Ownership (TCO) analysis revealed that, despite infrastructure upgrades and considerations for battery technology, the electric concrete pump's TCO was consistently lower than the diesel alternative, attributing this to the same upfront purchase cost, lower operating, maintenance, and servicing expenses.

Additional Benefits

Beyond the quantifiable advantages, electrification contributes to improved local air quality, safer working environments, and reduced risks associated with liquid fuel handling. It also mitigates combustion engine maintenance requirements and supply chain risks related to diesel fuel disruptions.

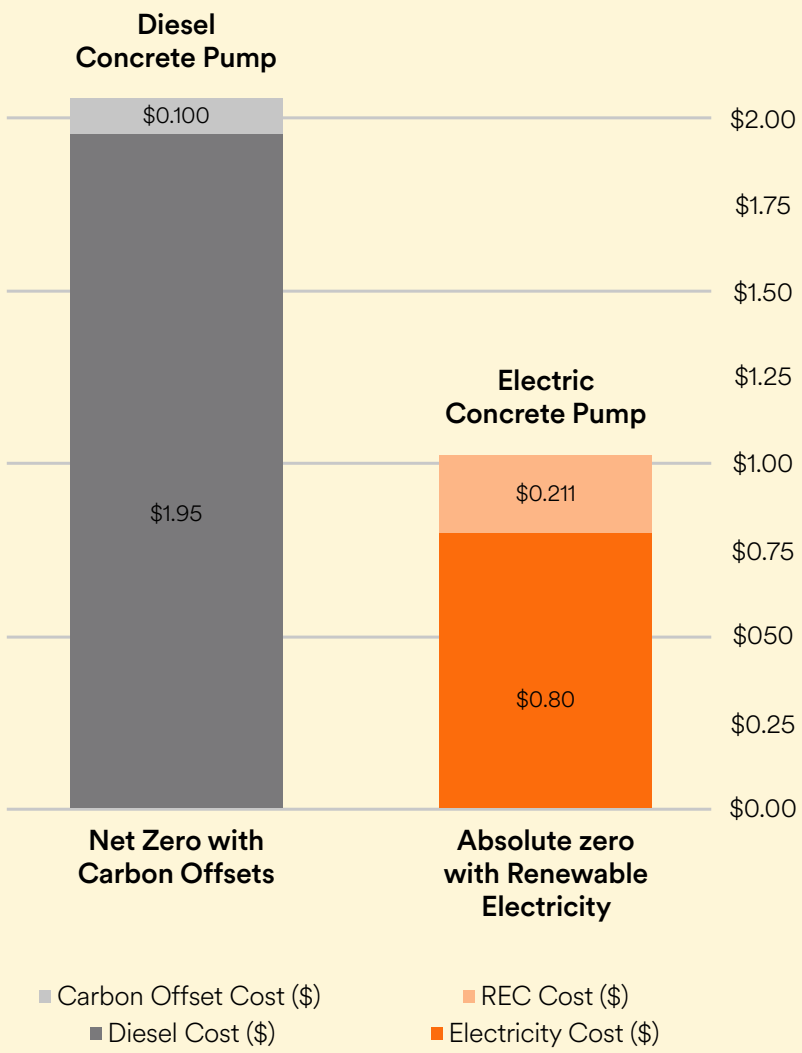
Future Considerations

Project-specific assessments of electricity supply, potential local grid constraints, and advancements in battery technology are critical when considering electrification. Ongoing research is also needed to clarify infrastructure costs associated with electrification, given the emerging adoption of battery use in the construction industry.

Conclusion

This research underscores the viability of electric machinery powered by renewable electricity in achieving Lendlease's Absolute Zero Carbon goal without compromising cost or quality. The study provides valuable insights for Lendlease and the broader construction industry on transitioning to fossil fuel free construction.

Average Cost for Concrete Pumping per cubic metre



Find out more in our detailed report here.

Contact

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