

# ECONOMICS DRIVE VIABILITY

“With few exceptions, decisions in the off-highway market are driven by costs,” says Dr. Scott Anderson, Ricardo. “The machines typically see heavy load cycles and are operated many hours per year. For machine operators to be compelled to buy a hybridized or electrified version of a product, it must positively impact their life-cycle cost.”

## 3 BASIC ASPECTS OF LIFE-CYCLE COST need to be considered:

- ➔ Impact of the system on acquisition cost
- ➔ Beneficial impact on operating cost
- ➔ Useful life

Hybrids must also allow a simplified solution. “For everyone to be successful with hybrid technology, you need to provide a machine that is so well optimized that you can get rid of component costs somehow,” says Elfsberg. This could be achieved by:

- ➔ downsizing of the engine;
- ➔ simplifying the hydraulics system; and
- ➔ de-coupling parts of the machine to be electronically — rather than mechanically or hydraulically — connected.

Hybrid technology offers the ability to peak load shave and handle transient engine loads, allowing the engine to be sized for a steady-state base load. “One option is to run the engine at an even higher engine power level and extract more from the machine for better productivity,” says Anderson. “That also increases the engine load and leads to better fuel efficiency.”

Another option is to use a lower engine rating to get the same job done. This can enable a less costly emissions solution near emissions break points and the displacement break points in an engine manufacturer’s portfolio.

“Finding opportunities near Tier 4 displacement break points may allow products to be developed that produce the performance of conventional products rated above the break point, but using a hybrid with a smaller engine that fits below the break point,” says Anderson. “That will help reduce cost and offset the hybrid system cost.”

