



Built to Last

Why life cycle support matters as much as capex in hydrogen projects

By Pawan K. Mehndiratta, Strategic Business Unit Head – New Energy, Green Hydrogen and Derivatives, Thermax

Green hydrogen procurement has a blind spot. While billions are being committed to electrolyser projects, most decisions still prioritise upfront capital expenditure (capex), with long-term performance and support receiving far less attention. That is risky, because an electrolyser is not a one-time purchase – it is a 20-25-year operational commitment. Over that lifetime, reliability, upgrades, spares and service will matter far more than the day-one price. In reality, the economics of ownership, not the purchase cost, will determine project success.

What this means for hydrogen project economics

When evaluated over a 20-25-year project horizon, the financial impact of comprehensive life cycle support is structural, not incremental. Improving availability from 85 per cent to 95 per cent through predictive maintenance and rapid local response delivers 10 per cent more hydrogen output from the same capital investment, equivalent to nearly two additional years of revenue over 20 years. Similarly, degradation management through optimised operations can extend stack life to more than 80,000 hours, deferring multi-million-dollar stack replacements by several years.

Energy efficiency preservation also becomes a critical economic lever. Digital asset performance management can maintain efficiency within 5 per cent of nameplate, versus 15 to 20 per cent degradation in poorly managed systems. With electricity accounting for more than 70 per cent of hydrogen production cost, this translates into millions in operating savings.

In parallel, single-point accountability and guaranteed availability can materially improve bankability. Even a 100-200 basis point reduction in financing cost can deliver \$20 million-\$40 million in interest savings on a \$100 million project. Combined, these effects can reduce the total cost of hydrogen production by 20-30 per cent compared to fragmented support models, even if the upfront equipment cost is modestly higher.

A new standard is emerging

Advanced buyers are no longer optimising for the lowest capex. Instead, they are optimising for life cycle economics, risk containment and long-term asset performance. A slightly higher upfront investment, paired with integrated life cycle support, consistently outperforms cheaper equipment burdened by unpredictable downtime, accelerated degradation and reactive maintenance.

Just as no airline would procure a commercial aircraft without a long-term maintenance agreement, separating electrolyser supply from life cycle support is becoming economically untenable. The electrolyser market is clearly bifurcating between transactional equipment suppli-

ers that are competing primarily on upfront price and life cycle partners that are competing on uptime, performance and total cost of ownership.

The hydrogen projects that succeed will not be those that minimise capex. They will be the ones engineered and supported for decades of reliable operation. For project developers, the question is no longer whether integrated life cycle support matters, but how quickly it becomes the default procurement model.

The counterintuitive reality is that companies that invest heavily in robust operations and maintenance (O&M) frameworks often achieve lower total cost of ownership than those focused purely on minimising upfront capital. Why so? Because unplanned downtime, emergency repairs and efficiency degradation compound exponentially over a 20-year project life. The organisations winning in green hydrogen are not necessarily those with the newest equipment. They are the ones that have recognised that operational excellence in emerging technologies requires fundamentally different support models than conventional industrial assets.

Moving forward

The electrolyser industry is maturing rapidly, but we are still in the early chapters of understanding what world-class operational support looks like at scale. The decisions we make today about long-term O&M support will determine which hydrogen projects deliver on their promised economics as well as which become cautionary tales. ■

The hydrogen projects that succeed will not be those that minimise capex. They will be the ones engineered and supported for decades of reliable operation.