

## ORCHESTRATING COMPLEX REFINERY WORKFLOWS WITH AI-DRIVEN PRECISION

BY SHIVANI MODY

At IEW 2026, we were proud to showcase our specialized technology solutions for a leading national oil company's LC MAX® unit. Installed at one of India's most advanced coastal refineries, this facility represents a truly unique, first-of-its-kind project globally. The unit achieves a remarkable 93% conversion rate, processing vacuum column bottom high-value products such as diesel and naphtha. Because the process involves five complex reactors, the operational requirements are incredibly sophisticated. To manage this complexity, we developed a dedicated digital suite that monitors how each reactor should be operated and analyse the complex incoming feed.

In a pioneering project like this, operators may be unfamiliar with the specific nuances of the equipment. Our digital suite provides vital assistance by offering early indications on how to best run the unit. If operating conditions drift from the optimal range, the system proactively alerts operators and highlights the required corrective actions. This first phase of the rollout includes a comprehensive crude blending algorithm, yield estimation, and catalyst inventory management. We are currently capturing data at a minute-level frequency, enabling us to perform critical calculations in real-time so that no detail goes unnoticed.

The second phase of this project focuses on advanced optimization and predictive analytics. The primary advantage here is that the tool provides operators and technical service teams with actionable insights to extract an additional 1% or 2% of conversion from the current operation. While that might sound small, it significantly increases margins and improves the bottom line. This integrated approach has worked exceptionally well for the entire unit, demonstrating how digital evolution is directly driving profitability and efficiency in the modern energy landscape.

### Specialized Solutions for the Oil & Gas and Energy Segment

As part of a premier process licensor group, Lummus Digital provides comprehensive digital solutions across the refining and petrochemical spectrum. Our expertise spans from optimizing CDU-VDU columns to advanced modelling for hydrocracker, fluidized catalytic cracking (FCC), and lubricating oil units. We offer digital twins and optimization tools for the majority of the technologies we license. By leveraging our highly proprietary models, we deliver actionable outcomes and precise coordination directly to our licensed customers, ensuring their units operate at peak performance.

### Improving Sustainability with Technology

Lummus Digital is committed to sustainability, integrating environmental goals into its core process licenses. Beyond hardware, we have developed a robust digital suite specifically for sustainable models. This includes sophisticated algorithms designed to track and calculate Scope 1 and Scope 2 emissions in real-time. By providing this level of granularity, we help our customers identify



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exactly which areas require attention, allowing them to minimize their carbon footprint and meet their environmental targets more effectively.

### Customer Experience at IEW 2026

IEW brings together a diverse audience from across the energy spectrum, and the level of engagement has been exceptional. While the nature of the challenges facing the industry has evolved, we find that the core problems remain remarkably consistent across customers. This commonality allows our solutions to address these challenges effectively. We are seeing significant traction because our digital directly address these modern complexities, and the shared interest from attendees confirms that we are providing the right answers at the right time.

### Trends Witnessed at the Exhibition

The 2026 edition feels remarkably different, as the gamut of participating industries has expanded to include everything from AI and digitalization specialists to green hydrogen and biofuel innovators, alongside traditional oil and gas players. This diversity reflects a more mature industry that is no longer looking at sectors in isolation but is instead focused on how they all converge to drive the global energy transition.