

# Engen Petroleum Improves Plant Production Schedules and Maximizes Profitability with Honeywell's RPMS



"Honeywell's decades of product development and industry expertise have helped us devise an exceptionally easy to operate and maintain solution that prepares us for the future in the most complex task of refinery planning. As a result, not only is our new system running smoothly and more efficiently, we have also greatly improved internal communication for adapting and reacting to the market."

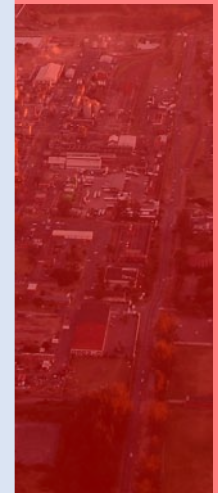
Engen Petroleum Ltd.

## Benefits

Engen sought an integrated system for upgrading its overall refinery production schedules and preparing for biofuels.

Among the benefits of the integrated system:

- Increased accuracy in production scheduling
- Simplification of the process needed to produce jet and bunker fuels
- Improved integration and accuracy of the refinery blend recipes
- Business-critical component production tank volume and lab quantities now are updated electronically
- New system design and work practices result in greatly simplified staff training
- Work practices now are institutionalized as opposed to being overly personalized and thus difficult to transfer to new personnel
- Newfound ability to react quickly to market changes or requests for changes in product lifting schedule
- Vastly improved ability to plan and analyze future business requirements and opportunities



to deliver improved Honeywell RPMS

Engen Petroleum, a company that has held strong through wars, apartheid and recessions. Today, Engen is recognized not just as an industry leader, but for its stellar record in business, ethics, justice, corporate citizenship and equality.

A subsidiary of Malaysia's Petroliaam Nasional Bhd (Petronas), Engen boasts the largest market share in South Africa's petroleum industry and has interests in more than 20 African countries.. Engen owns and operates its own refinery, which produces more than 125,000 barrels of oil per day, employing about 3,000 permanent staffers.

## Challenges

Engen Petroleum's interests include refining crude oil, marketing and retailing primary refined petroleum products and providing consumer convenience services through its retail network. The company owns and manages a complex crude oil refinery and a state-of-the-art lubricants blending plant at Durban.

The Durban refinery produces both lead replacement and unleaded gasoline as well as lubricants and chemicals. With the increasing demand for unleaded gasoline, Engen needed to find a solution to optimize the volume usage of the high-octane components, which would facilitate a refinery-wide move toward a lead-free gasoline. The project required significant input for the design team, drawing on the company's experiences in the field and applying them to an entirely new application. The design team had to build this system, so they had to create a robust architecture and schedulers. The project required the involvement of internal and external experts to ensure minimum reliance on external resources.

As Engen's relationship with Honeywell spans several decades, it was logical to turn to Honeywell experts to provide the solution. Honeywell's operating such an advanced system is a testament to their mutual benefit. Honeywell's expertise, combined with its previous plant experience, provided much historical data and insights into the lead replacement. This project required a high level of complexity and coordination to optimize the gasoline production process.

Stellar data integration and real-time monitoring functionality were essential for the project. Working with system designers, Honeywell ensured the system would be simple and efficient. The system was designed to not require additional resources in order to maintain daily routines.

"Any change in fuel specification affects the entire supply chain," said Dr. Abbas Azizi, Linear Programming Specialist, Engen Petroleum Ltd. "This process requires a complex mathematical model to take into consideration a number of factors, including production by site, raw materials, product components and cost/pricing; product manufacture, blending and specification."

As Engen saw the system, the task at hand required meeting a list of key functional objectives as well as a number of crucial

systems design requirements while adhering to clearly defined implementation guidelines. The final goal was to transition from having an acceptable plan to an optimal – or close to optimal – plan.

Some of the objectives of this project included:

- Utilize as much existing infrastructure as possible
- Use appropriate technology and transferability of skills
- Avoid unnecessary complexity
- Facilitate integrated data flow and work practices

The project required the development of an optimized scheduling and scheduling system. Linear Programming (LP) is a mathematical scheduling LP technique used to optimize refinery operations. Traditionally, Engen used Chemical Modeling and Simulation (CMS) to optimize the capabilities of refinery operations. The system also used to study the impact of base-out

Honeywell's system was designed to integrate assay data. The system was a specific tool to optimize the scheduling and scheduling

The company's blending operations involve the pooling of various gasoline components into tanks and the isolation of other components into multiple tanks dedicated to key components. These components then need to be blended under online blend control to dedicated product tanks.

The new system supports this capability, where the supply planning model provides input to the monthly refinery operating planning process. Generating the monthly Refinery Operating Plan (ROP) is one of the major applications of the new Honeywell system. The system is used to satisfy a multi-period (three-month

roll-over) refinery production plan. The results of the ROP provide input to the multi-period blending and scheduling process. Then the final application electronically passes the blending orders to the online blend control system.

Monthly planning involves the usual supply chain activities, including crude evaluation and selection, process optimization, product manufacture for a segmented market as well as product inventory and distribution. To meet the diverse needs of a broad set of business line functions, the integrated system essentially works as a decision support tool connecting the various activities derived from these “information silos” and passes on this data for use in monthly planning.

Data from the various units is used to generate the data from the scheduling LP. The data from the scheduling LP is used in the advanced control system. The advanced control system regulates the qualities are regulated using Honeywell’s RPMS LP uses Xpress-MIP mixed integer programming for LP scheduling for LP and

“As we look to the future, we see the need to move our operations to reduce the sulfur content. Our second emphasis will be on the production of unleaded gasoline. An integral role in this process is

Investigating both the

**More Information**

For more information on the Refinery Planning & Petrochemical Modeling System (RPMS) or any of Honeywell’s Automation Products, Services, or Solutions, visit our website [www.honeywell.com/ps](http://www.honeywell.com/ps), or contact your Honeywell account manager.

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newly introduced integrated planning and scheduling system. The goal for Engen is to maximize gasoline production while meeting the lower sulfur and the higher octane demand.. Considering that the octane requirements in South Africa are higher than in many other parts of the world, the move toward more unleaded gasoline with the lower sulfur and the higher octane creates a considerable octane imbalance.

Due to the number of factors involved with the new platform, the addition of various new units will be undertaken in a series of modeled-in phases. Although this approach may be time-consuming, it will allow Engen to gain a better understanding of



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