CASE STUDY

Dual Refinery Operator Identifies $18M per Year in Savings

Solomon Applies Performance Excellence Process™ to Map Improvements in Yield and Performance at Operator’s Two Refineries

CHALLENGE

The owner of two refineries wanted to improve yield and performance at both plants individually and across all operations.

SOLUTION

Refinery management brought Solomon in to apply its Performance Excellence Process and analytical tools toward identifying gaps and opportunities.

RESULTS

The operator quickly achieved $2M in savings.

Understanding the landscape

A manager of two refineries wanted to improve yield and energy performance at the individual refineries and across the combined operating complex. The refineries were moderately complex, with a combined crude capacity of more than 325,000 barrels per stream day. They produced low-sulfur transportation fuels, lubricants, and a variety of specialty chemicals and derivatives used as feedstocks for the chemical, petrochemical, plastic, textile, fertilizer, rubber, paint, and solvent industries.

Establishing targets

Having invested in process and linear program (LP) models, the refineries exhibited significant opportunities to improve yield and energy performance (see Table 1). The project goal was to close at least 10% of the energy gap ($6M per year) at the largest refinery without capital investment by the conclusion of the engagement and 20% of the overall energy gap ($12M).

Table 1. Performance Gaps and Opportunities

<table>
<thead>
<tr>
<th>Gap Description</th>
<th>Gap Value, $M/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Efficiency Opportunities</td>
<td>104</td>
</tr>
<tr>
<td>Conversion Unit Yields</td>
<td>26</td>
</tr>
<tr>
<td>Operating Expense (OpEx)</td>
<td></td>
</tr>
<tr>
<td>• Energy</td>
<td>60</td>
</tr>
<tr>
<td>• Maintenance</td>
<td>--</td>
</tr>
<tr>
<td>• Non-Maintenance Personnel</td>
<td>--</td>
</tr>
<tr>
<td>• Other OpEx</td>
<td>18</td>
</tr>
</tbody>
</table>
Evaluating processes

Solomon’s team of subject matter experts started from the ground up, using Solomon’s Performance Excellence Process™ methodology to evaluate yield and energy gaps at each refinery. The team’s assessment utilized analytical tools that measured and evaluated planning and optimization, process unit yields, and energy efficiency. Proprietary tools such as Deep Drill-Down (3D) Data Analysis, Energy Diagnostics, Best Practices Assessment, Process and LP Model Audits, and the Developing Initiatives Workshop were used to diagnose the root causes behind the gaps and develop an immediate response.

Realizing results

These assessments uncovered more than 100 initiatives to undertake, including 16 quick hits — measures that can be implemented right away to start improving processes. In the first 3 months, the refinery achieved documented savings valued at $2M. Ongoing recommendations from Solomon included:

- Improving stripping steam effectiveness
- Optimizing steam generation throughout the refinery
- Improving the effectiveness of the crude unit preheat train
- Developing a program to emphasize furnace efficiencies through gap monetization
- Optimizing the temperature profiles of several distillation columns

The refinery has made very good progress and has plans for further implementation that should result in achievement of its target within another year.