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Top Ten Ways to Increase Site Energy Efficiency

By Albert Galgut

Assuming operational efficiency improvements have been realized to a large extent, further increases in site energy efficiency are accomplished via implementation of modest, incremental capital investment opportunities. An energy loss analysis is conducted to quantify energy lost to air / water cooling followed by Process Flow Diagram brainstorming reviews to identify potential capital projects that will reduce fired heater and boiler fuel consumption. Top 10 opportunities include:

1. Install additional heat exchangers in various feed preheat circuit configurations (e.g., crude, hydrotreater, reformer, light ends, amine rich / lean preheat circuits).
2. Replace existing bare tube heat exchanger bundles with finned tubes to allow utilizing lower pressure steam in reboilers / preheaters.
3. Replace existing bare tube heat exchanger bundles with twisted tube bundles to take advantage of higher surface area available in same shell.
4. Recover energy in various steam utility system streams (e.g., steam vents / letdowns, boiler blowdown, condensate, etc.).
5. Maximize deaerator feed temperature to reduce deaerator steam demand.
6. Maximize boiler feedwater temperature to reduce boiler firing.
7. Install waste heat boiler to generate steam and reduce boiler firing.
8. Reduce / replace steam utilized in reboilers / feed preheaters with waste heat.
9. Install mid-reboilers in light ends towers to utilize lower level / waste heat.
10. Install additional surface in fired heater convection sections to reduce stack temperature / furnace firing.

About the Author

Albert Galgut is a Senior Engineering Advisor with a broad experience base in all aspects of refinery technical operations support and management (e.g., facilities planning, design and operations, and energy optimization program development) gained in a 30+ year career with ExxonMobil.

Please contact Jerry Lacatena (jlacatena@carmagen.com) if you'd like more information on Carmagen's expertise in this area.

Work Highlights

Process, Operations & Safety

- After assisting with completion of the proprietary quench tower design package, supported the startup/performance test at a plant located in the Middle-Eastern region.
- Providing licensing consultation with particular focus on hydroprocessing and catalytic dewaxing technology areas.
- Developed and facilitated a start-up team workshop for a clean fuels project conducted overseas.
- Supporting ongoing PIMS simulation modeling and refinery optimization on various projects. For the most part, this support is provided "remotely" with onsite visits made as required.

Project Management

- Provided onsite construction management consulting support on the Cogen portion of a major Canadian oil sands project during an approximate three month assignment. Assisted in the development of integrated and optimized project plans, and provided recommendations to the Owner on fabrication and constructability questions, drawing reviews, risk assessments, time line requirements, site safety, etc.