



## Heavy Fuel Oil Upgrade

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### Abstract

- The objective of this project is to design a method to convert, or eliminate, high sulfur fuel oil by converting it to asphalt.

**Solution:** Solvent deasphalting (SDA) is the chosen technology. SDA converts High Sulphur Fuel Oil (HSFO) to deasphalted oil and pitch.

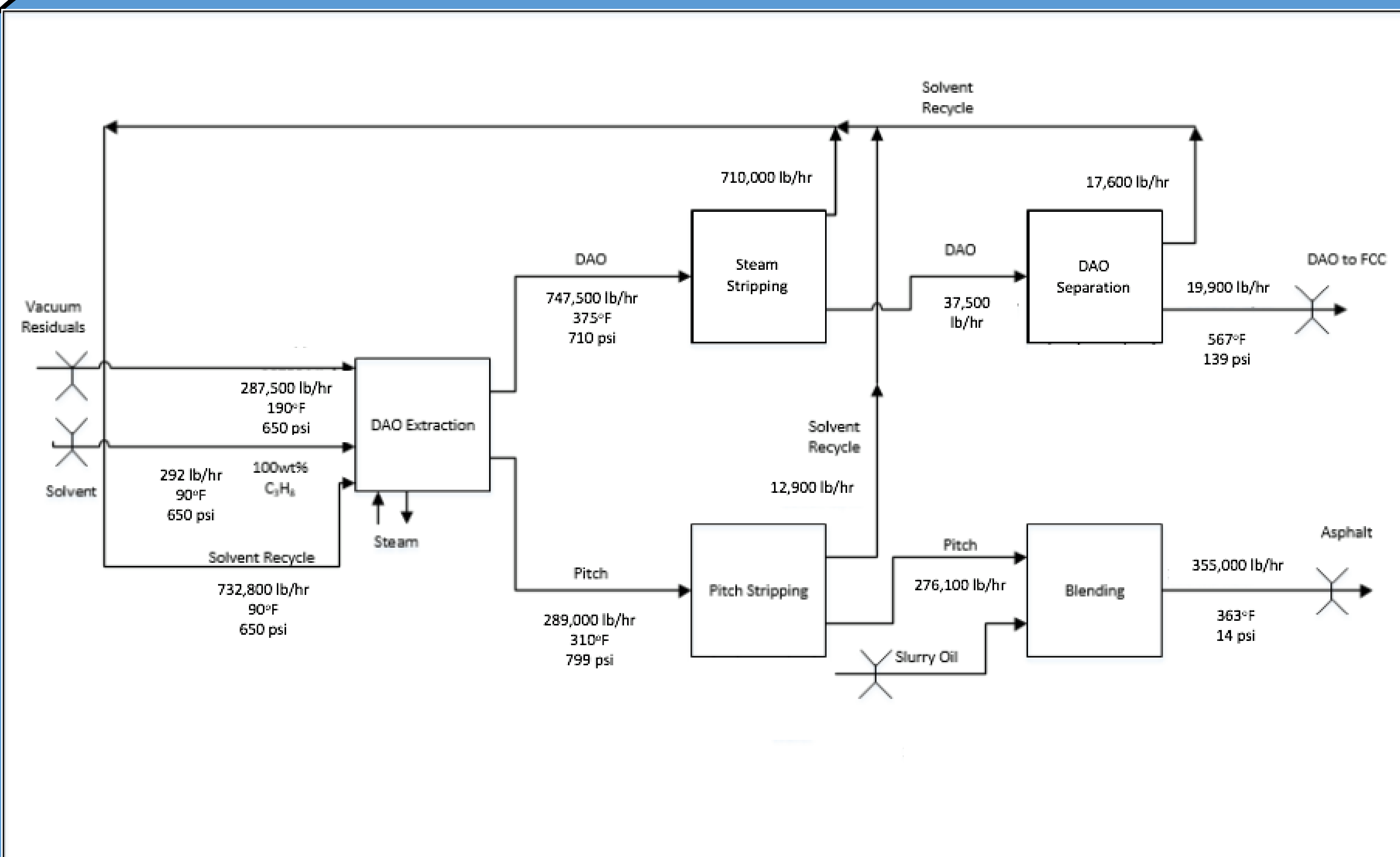
- Total capital cost: \$61 Million
- Annual operating cost: \$425 Million



### Background

- The International Maritime Organization has reduced the limit for sulphur content in fuel oil used in marine vessels to 0.5 wt% as of January 1<sup>st</sup>, 2020.
- New regulations reduces the demand for High Sulphur Fuel Oil.
- To mitigate losses expected from selling HSFO, increasing Asphalt production seems to be the most economically feasible solution and is the target of this project.

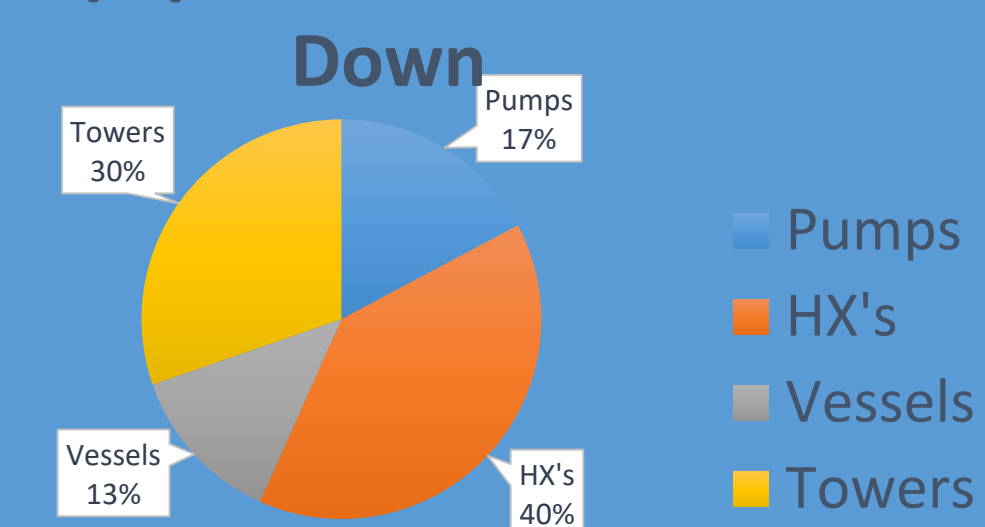
### Process Description



- Vacuum residue enters the deasphalting unit from a vacuum distillation tower.
- Liquid propane enters to the bottom of the extraction tower.
- Pitch is removed from the bottom of the extraction tower and is directed for further separation.
- Pitch separation is done using steam stripping column.
- The final pitch product goes to the blending where it mixes with the FCC slurry to produce the final Asphalt product.

### Economics

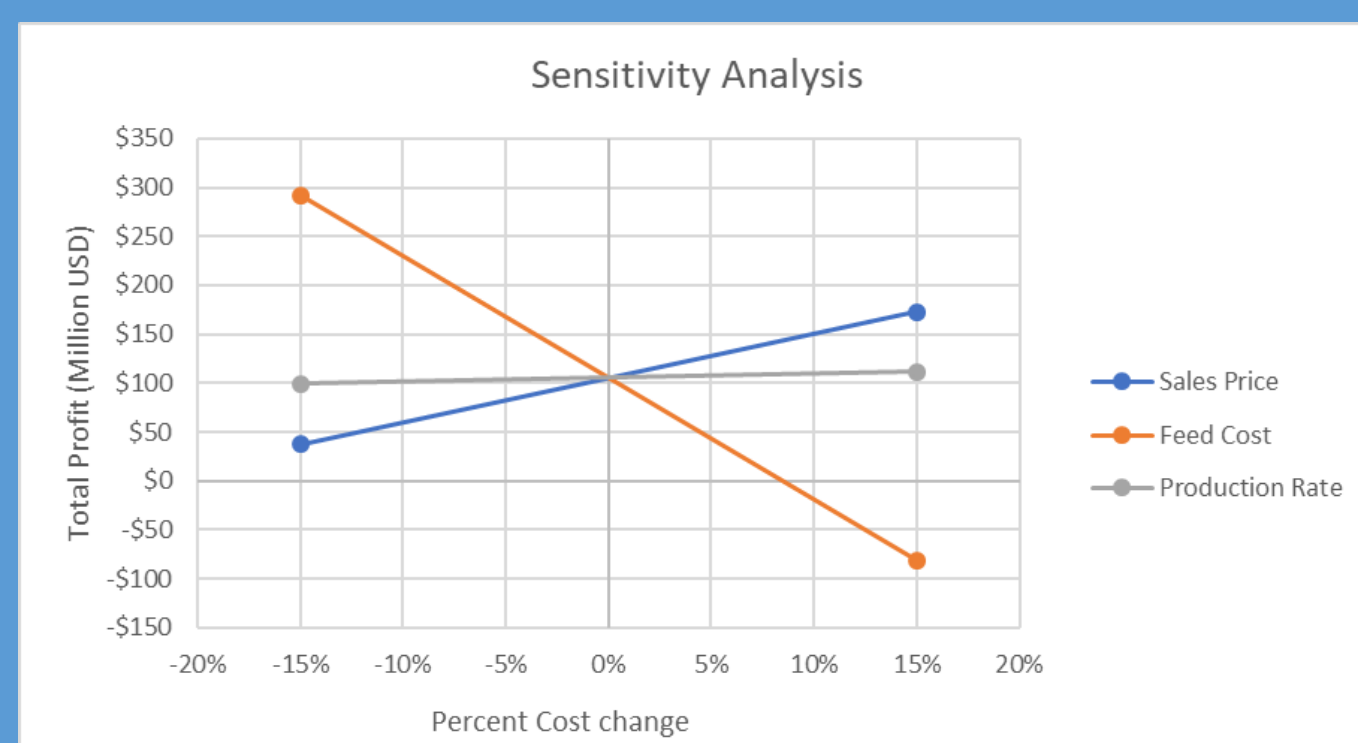
#### Equipment Cost Break



➤ Bare Module Costing Method Used

42% ➤ Annual ROI

Location Factor ➤ 3



### Key Takeaways

#### Design Features

- Liquid-Liquid Extraction
- Propane Solvent
- 99% Solvent Recovery

#### Production

- 334 (bbl/hr) Asphalt
- 370 (bbl/hr) DAO

#### Recommendations

- Use LSR as solvent in winter months for higher DAO Yield

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