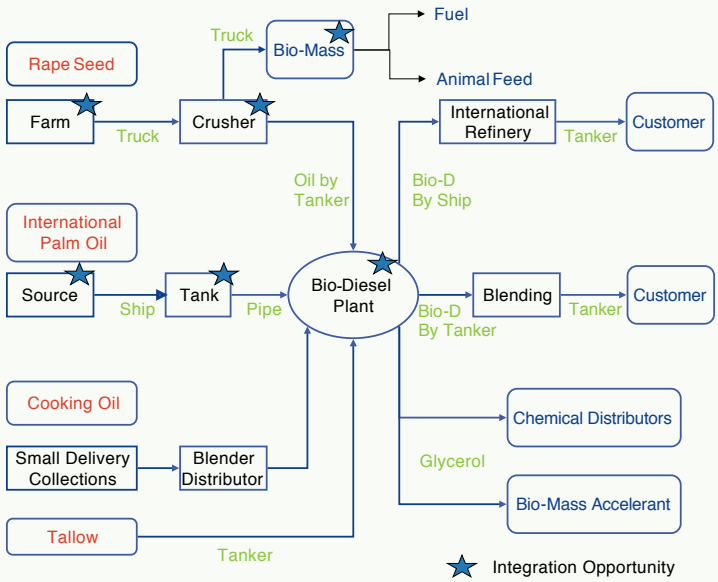
CASE STUDY II
FUELLING FLEXIBLE SOLUTIONS
The biofuels (biodiesel and bioethanol) supply chain

Introduction

Biodiesel and bioethanol supply chains have similar characteristics, one being derived from natural oils and the other from crops such as sugar cane and corn. A typical biodiesel supply chain is shown below, and reflects the general complexity found across petrochemical supply chains.

Biodiesel supply chain



The supply chain involves many different stakeholders, which makes it complex to manage. In addition, this chain is subject to many sources of uncertainty in supply and demand, in the process, and in the environment.

Opportunity

Raw materials are high-volume commodity rapeseed, palm oil, soya or tallow and cooking oil. Supply of these raw materials is impacted by many factors, so companies must be flexible and try to ensure timely access to products. For example: rapeseed is higher priced and needs to be locally sourced; soya from Argentina is affected by national government desires to add downstream production; vegetable oil prices are influenced by China's huge but fluctuating demand; cooking oil is best priced but must be collected and cleaned by blenders; and crop yields are driven by the weather and global events.

Regulations also affect the supply chain. These include: import or export tariffs; complicated classification further affected by "splash and dash"; certification systems; and the percentage quota of biofuels to be added to fossil fuels.

Environmental issues include carbon credits, deforestation, animal habitat, transparency and the need to supplement fossil fuels.

Prices swing according to demand, crude oil prices, government regulations, low temperatures (cold flow plugging), by-product markets and the supply factors mentioned above.

CASE STUDY 23

END-TO-END ENHANCEMENT

Computer modeling and dashboards to optimize a global supply chain

Introduction

Following the approval of a multi-million dollar investment in additional MMA production capacity from the Middle East, scheduled for start-up in 2015, Lucite wished to take the opportunity to evaluate alternative shipping routes and parcel sizes, time charter vessels, alternative bulk storage locations, variable production capacities and optimized location sourcing using computerized software modeling techniques.

Opportunity

For example, the Agility approach uses computer modeling for supply chain optimization of the combined production volumes from 13 global manufacturing locations operated by Lucite and Mitsubishi Rayon Company Ltd (MRC). The scope includes individual fixed and variable costs, utilizing bulk shipping routes and parcel size, including ISO tanks.

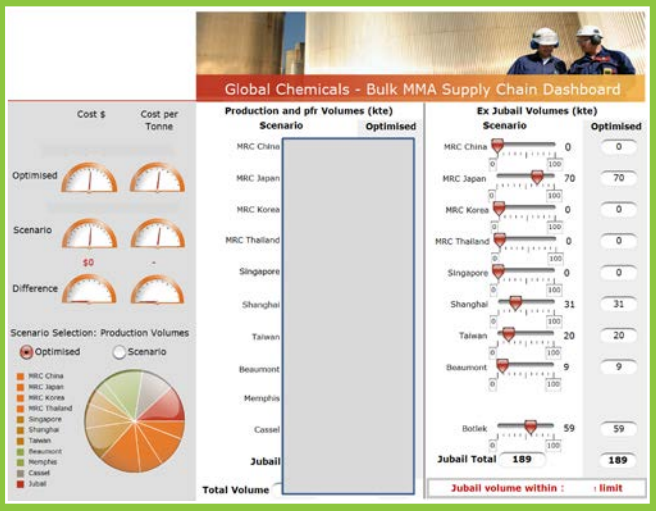
An essential part of modeling is to understand the local operational or economic issues (for example tax free zones) and to have full cooperation / understanding from all parties when developing scenarios, which includes the following components:

- Variable production costs and volumes
- Optimized customer to plant production based on entire supply chain cost
- Alternative shipping routes and parcel sizes
- European ISO tank consideration
- Forecast customer demand and production capacities
- Middle East production consideration given to the inventory impact on stock holding while product was at sea (in transit)

The Solution (Technology Application)

The solution is based on the development of a bulk shipping and manufacturing sourcing optimization model to evaluate alternative logistics strategies, for forecast customer demand volumes, by flexing production costs, alternative shipping lane availability, bulk parcel size variance and optimized customer to manufacturing plant allocation.

In addition to evaluating various production scenarios, Lucite uses interactive dashboards to assess production sourcing costs during scheduled plant shutdowns, and to compare their shipping rates with those of the market and mid-size chemical companies.



The Value

The strategic design model and dashboards allow global sourcing and optimum end-to-end supply chains for the business, covering all the components in the Business Case above, simplifying strategic and operational decisions and, in particular, generating significant competitive advantage.