



PETRONAS

New Way of Working

AVEVA World 2022

15.11.22

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PETRONAS



Malaysian National Energy Company



Global reach >100 countries



Our Business

Upstream



Downstream



Oil



Gas



Petchem



Base Oil &
Lubricant



Clean Energy
Solution

An Agile & Intensified Optimisation with Integrated Planning Tools



PETRONAS

Challenge

Limitation as well as **complexity of modelling** in existing & **outdated** optimisation tools result in lack of **pace** and **agility**.

Lack of uniformity within the planning ecosystem also proves to be a major hurdle in unlocking potential **unseen opportunities** across the value chain.

Tedious & lengthy planning process leads to **poor work life balance**, lowering the team's morale.

Solution

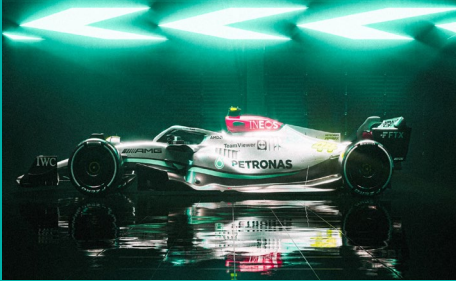
Redefine the way we work with implementation of **New Way of Working**, including adoption of the **same integrated optimisation tools** within the ecosystem.

Benefits

- **Seamless** crude data flow which enables seamless collaboration and easier data maintenance.
- **Increased productivity** which enables better collaboration & work-life balance.
- **Agile & intensified** re-optimisation which heightened visibility & value optimisation.

Part 1 – New Way Of Working (NWOW)

Passionate about Progress....



PACE

- Fast and agile
- Improve efficiency
- Work-life balance



CAPABILITY/ COMPETENCY

- Faster learning curve
- Able to do more and better
- Focus on business competencies rather than tool
 - Improve staff mobility



TECHNOLOGY

- Up-to-date technology fitting with the digital evolution \ adoption



COLLABORATIVE

- Unified communication platforms
- Single source of truth
 - Better data management

Limitation in existing optimisation tools and lack of uniformity in optimisation tools used by each refining site results in lack of pace and agility

Limitation & lack of technology updates

- 🙄 Delayed decision making
- 🙄 Limited time to run more extensive and rigorous scenario planning
- 🙄 Lagging model maintenance leading to potential inaccuracy and misalignment between plants
- 🙄 Lower team's morale due to lengthy & laborious analysis and model maintenance
- 🙄 Unable to cater for the increased complexity in supply network

Multiple optimisation tools used in various processing site

- 🙄 Lack of single point of truth (change in crude assay is not synchronised)
- 🙄 Duplication in data entry
- 🙄 Lack of integrated network model to simplify enterprise optimisation

Vision of New Ways of Working

- Suspending the optimisation practice of using multiple models (Spreadsheet / LP) – with the adoption of integrated network model
- Simplifying and accelerating processes in updating crude assays and performing model update

1



Disrupting Existing Tools & Workflows with Technology Adoption

- Synchronizing planning basis through adoption of single optimisation tools using an integrated platform
- Enabling sharing of crude data and experience across multiple functions within the organization

2



Seamless Collaboration & Frictionless Communication

- Easier scenario case set up leading to faster solution
- More rigorous scenario planning with pace to yield more robust solution

3



Heightened Agility in adapting to External & Internal Changes

- Improving accuracy and eliminating sub-optimal by replacing the legacy tool
- Focusing on value adding task and eliminating duplication and redundancy

4



Improved Accuracy & Eliminated Redundancy

Vision of New Ways of Working

- Emphasizing on proper governance and transparency of data
- Enabling single source of data usage for Enterprise
- Standardizing basis and reference data used for planning and optimisation

5



**Strengthened Data
Control & Operational
Decision Governance**

- Increasing stakeholder confidence by reinforcing single point of accountability
- Enabling flexibility in customised reporting to adapt to business requirements

6



**Transparency &
Advanced Reporting**

- Enhancing learning curve with easy modelling structure
- Increasing productivity which enables better collaboration & work-life balance

7



**Improved Team
Morale**

Part 2 – The Journey

What we learned, how we did and our success story

Improvement that enhance our productivity and user capability



Flowsheet interface makes it easier to understand model configuration



Modelling is much easier



Easier maintenance on Crude Database



Constraints are easier to set up through 'calculation' & can be grouped based on type for easier reference



Special coding is no longer required



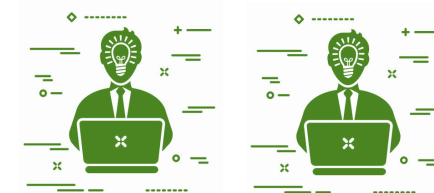
Easier to perform scenario-based analysis ie : Analytics, Tranches, Process Model Simulator



Active & timely customer support



User

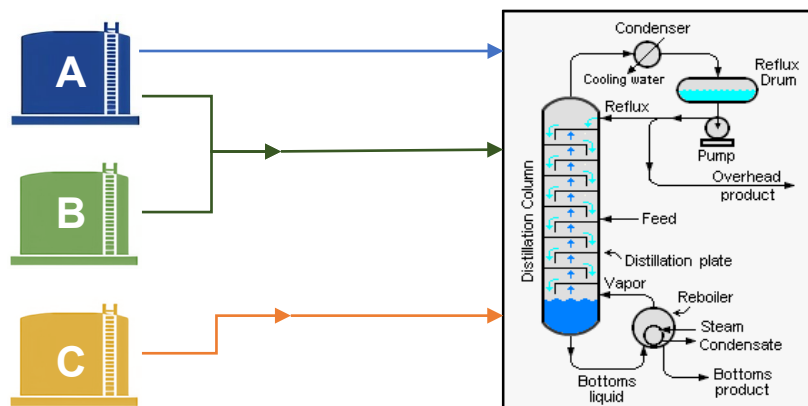


Modeler

Specific Case Improvement

Spiral Plan

Crude Pairing Calculation for better optimisation on crude



- The constraints are modelled by using **calculations** featured in the **Constraints & Alerts**
- Assignment of inventory for specific crude

Thus, eliminating previous practice of manual calculations and re-assessment of the processing feasibility of the chosen crude slate by the LP

Spiral Network

Usage of Price Set benefits in time saving & improve collaboration.

1. User can choose easily which price sets is preferred through **drop down windows**
2. Whenever the price data is updated by Master Data, user can update the model with simple steps instead of reverting to the old practice of **copy + paste**
3. Transparency among the users on pricing formulation & basis is established through **Parameters & Pricing Data**

Improve pace by developing customised report

Spiral Network

A customised report for a summary on HC flows

1. A **customised report** has been developed with **AVEVA support** to give more clarity on each plant input, production and output, including the crude supply allocation between processing vs export.
2. With this report, we can have an **overall view** to our supply & demand throughout the ecosystem encompassing all relevant plants and supply & demand points.
3. The customised reports provides a holistic view of the profitability as well as the profitability of each processing complex.

OVERALL MATERIAL FLOW			Contents Page																	
SELECT PERIOD >>			Period 1																	
SELECT FLOW BASIS >>			KBBL																	
Period Duration (days)			31																	
			OPENING INVENTORY + SUPPLIES or IMPORTS + PRODUCTION or (CONSUMPTION) = SALES + CLOSING INVENTORY																	
A F	Active Flow?	Material Type	Traded Material	Opening Inventory			Supplies / Imports			Production / (Consumption)				Sales						
				Refinery A	Refinery B	Terminals	Refinery A	Refinery B	Supply	Refinery A	Refinery B	Refinery D	Plant C	Crude Demand	Plant D Crude Demand	Plant D Product Demand	A Demand	B Demand	C Demand	D Demand
A	Active	Diesel	E2M DSL	-	-	-	-	-	xxx.xx	-	-	-	-	-	-	-	xxx.xx	-	-	-
A	Active	Diesel	E2M DSL Common	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
A	Active	Diesel	E5M DSL	-	-	-	-	-	xxxx.xx	-	-	-	-	-	-	-	-	xxx.xx	xxx.xx	xxx.xx
	Active	Diesel	EXP DSL 0.001	-	-	-	-	-	xxxx.xx	-	-	-	-	-	-	-	-	xxxx.xx	-	-
	Active	Diesel	EXP DSL 0.05	-	-	-	-	-	xxxx.xx	-	-	-	-	-	-	-	-	xxxx.xx	-	-
	Active	Diesel	EXP DSL 0.25	-	-	-	-	-	xxx.xx	-	-	-	-	-	-	-	xxx.xx	-	-	-
		Diesel	EXP DSL 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Diesel	Sour DSL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Diesel		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Modelling approach taken to meet our specific plant operations in improving our decision making

Spiral Plan

Inventory modelling

1. Crude Opening Inventory

- In Spiral, when crude inventory is carried over to subsequent period, the crudemix will be consumed based on the resultant ratio of the initial inventory & the new purchased crudeslate.
- However, this may not reflect actual processing ratio in the plant where initial inventory will be consumed first, followed by subsequent purchased crudeslate due to delivery date, or processing ratio limitations.
- In tackling this issue, we **model separate tanks** for opening inventory & crude receipt and further **defined the crude based on types** (e.g. HAC, light sweet, medium sour) in order to have better control on the opening inventory in the subsequent period.

2. Product Inventory

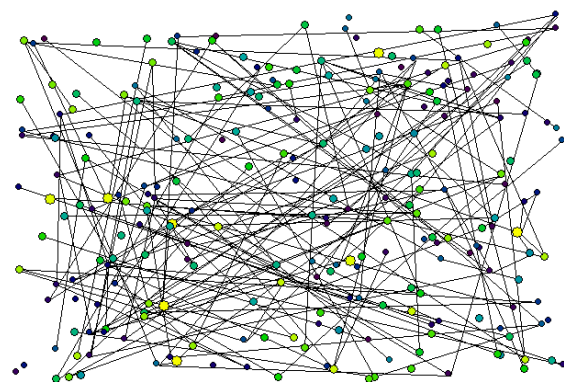
- Products in closing inventory needs to meet the grades specified in the **Inventory Summary** page.
- However, this is not applicable if the tank is used for multiple products .
- **Overoptimisation** can happen where off-spec product is kept as inventory in Period 1 and re-blended for to meet specification for sale in Period -2.
- For this issue, the user need to be careful on the LP movement at this kind of inventory.

Modelling approach taken to meet our specific plant operations in improving our decision making

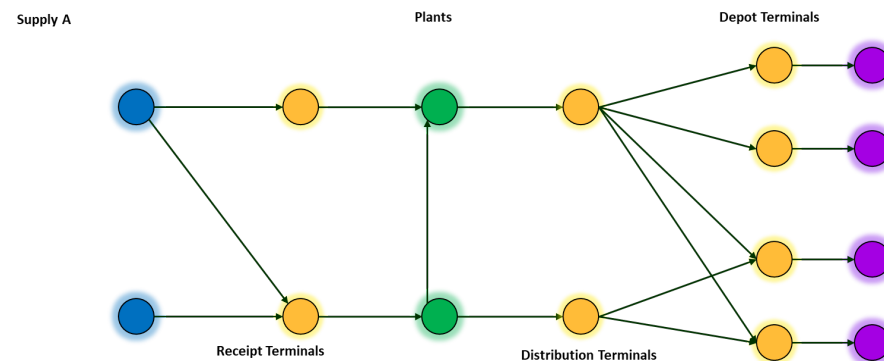
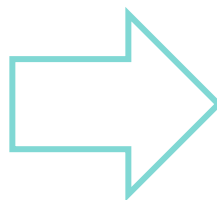
Spiral Network

Supply and distribution network

1. With actual numbers of supply depots in our system, the modelling **runtime** is **longer** than our expectation running time.
2. To minimize the modelling structure, the **depots** are grouped by **region** to minimize the time taken (pace) vs value of modelling accuracy.
3. This will also ease the **model maintenance** activities.



Original - ~500 Demand Transport Links



Final - 250 Demand Transport Links

Part 3: Future Improvements

We look forward to stronger collaborations between AVEVA and our team with multiple improvement ideas identified for future enhancements for the software

Enhancement to the features to improve analysis study & pace

- ❖ Capability to **update opening inventory quality** within individual models for operational optimisation i.e. ability to detach opening inventory quality from Reference Data.
- ❖ Enhancement to the Network Model **standard report** i.e. include breakdown obj function by plants.

User Experience Improvements

- ❖ Automation of **watchsets** whenever items are deleted from standard tables eg Supply, Demand, Transfer Links.
- ❖ Introduce **Excel Add-in** for Price Sets data entry.



Speaker Details



Shuhaizura Shuib

TP Planning (Principal)

- haizura@petronas.com



Nora Rashid

TP Planning (Staff)

- nora_rashid@petronas.com



Zharrieq Haizzad

Ref Crude & LPG Scheduler

- muhdzharrieq.zainol@petronas.com



Questions?

Please wait for the microphone.

State your name and company.



Terima Kasih Thank you



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“A progressive energy and solutions partner enriching lives for a sustainable future”



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Passionate about Progress