



# OUT OF UNCERTAINTY COMES OPPORTUNITY: THRIVING IN THE NEW REALITY

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Refinery operators were already facing mounting challenges in 2019: declining demand for gasoline and diesel in some markets, new and very efficient capacity coming on-stream and increasing regulatory requirements, to name a few. Then, 2020 brought even more difficulties with the unprecedented challenges to operations brought on by the COVID-19 pandemic.

Global economic challenges prompted a dramatic fall in product demand and skewed product slates – sales of gasoline and diesel fell steeply and jet fuel sales fell by as much as 90% at one point. Recovery will probably be prolonged, and the repercussions will be long-lasting.

All of these factors present refiners with a dilemma: how to make smart investments while preserving cash in order to maintain their competitive position, when failing to invest could mean competitive vulnerability.

**SHELL CATALYSTS & TECHNOLOGIES**  
TRANSFORMING ENERGY TOGETHER

## THE CASE FOR REFINERY REVAMPS

At [Shell Catalysts & Technologies](#), we have always advised customers to consider revamping, repurposing or upgrading their existing assets. In our experience, this can be more capital efficient than adding new units and better return on investment.

The benefits of a [refinery revamp](#) and this smarter and more focused investment are discussed below.

### LOW CAPITAL EXPENDITURE

The cost can be as low as a few million dollars to generate higher upgrade margins within single units up to \$100–500 million, realising significant changes in refinery configuration.

### HIGH RETURNS

The cost per tonne of the capacity installed during a revamp is about 20–50% of that for a grassroots facility. Such projects are therefore even more relevant in the new reality.

PREVIEW THE SIX TECHNOLOGY SCENARIOS WE'LL BE FOCUSING ON IN THIS SERIES BY EXPLORING THE LIST BELOW:

#### Reactor Internals



Shell reactor internals have improved the performance of more than 550 separate projects, equating to nearly 1,700 hydroprocessing reactors, most of which are in non-Shell facilities.

#### Vacuum Distillation



Revamping VDU units using Shell's deep-flash, high-vacuum technology can often be a low-cost way to unlock downstream assets, as it can help to increase vacuum gas oil (VGO) yield, enhance unit throughput and improve unit reliability.

#### Hydrocracking



Shell has worked with refiners worldwide to help increase capacity, increase or decrease conversion to adjust the yield profile, and to extend cycle length by increasing crude flexibility or mitigating fouling.

#### Distillate Hydrotreating



Revamping diesel hydrotreaters can be a timely, relatively low-cost response to several issues that often brings very strong financial returns on investment, including meeting stringent product quality specifications and reacting to regulatory changes.

#### Ethylene Oxide



Our tailored ethylene oxide (EO) revamps are carefully designed to help you meet your objectives, reduce energy and production costs, change the product mix and increase work rate.

#### FCC-PT/FCC



Shell has developed the expertise to help refineries meet the economic ambitions of their units, enhance competitiveness and adapt to today's new reality by implementing optimum integrated solutions.

### ADAPTING TO THE NEW REALITY

This is not an easy transition. Current [market challenges](#) may not be temporary setbacks from demand decline, and refinery operators may not be able to simply wait out the current circumstances and expect to return to “normal”. It may not be reasonable to expect all our operations will return to the way they were before 2020.

Rather, we see how existing challenges are accelerating action around [energy transition](#) conversations that have been ongoing for decades, as well as accelerating the change in product demand slates.

The energy transition is about de-carbonising our society and reducing the amount of greenhouse gas molecules in our atmosphere. The CO<sub>2</sub> Carbon Chain is everywhere in our society, making it a very diverse and complex challenge that will require many types of solutions.

We see this as a time for reinvention, and we’re applying this philosophy forward to help our partners adapt and modernise their facilities.

Revamp projects can be more complex in the implementation phase than grassroots initiatives.

This is where our experts’ strong experience can help refiners identify and implement collaborative solutions.

Through revamps, we can help refiners optimise their facilities to meet changing product demand slates. For example, we’ve helped refiners upgrade equipment to process [crude oil](#) into higher yields of [petrochemicals](#) feedstock, which can help them adapt to changing regional market conditions.

We see revamps as one strategy among many that refiners, in particular, can use to transform operations, optimise efficiency and thrive over the long haul.

### STARTING THE JOURNEY WITH REVAMPS

Revamping, repurposing or upgrading existing units is one feasible strategy for refining operators to retain their competitive advantage while adapting to changing market conditions.

Revamps often require small, incremental investments, which can be highly appropriate in today’s market, as they carry low investment risk, generate credibility with investors and provide ongoing flexibility as market conditions change.

Such projects are, by definition, low in capital expenditure because we seek to repurpose existing [refinery equipment](#).

We try to minimise capital requirements for major equipment; the kit that needs to be acquired is usually limited to items that have a modest capital cost. Furthermore, we seek synergies with the units already on the ground, which helps to enhance the return on investment.

We co-create revamp solutions by working with customers to improve operations and increase ROI. Our experts at Shell Catalysts & Technologies have a strong history of delivering a wide variety of value-adding revamping and upgrading projects at Shell sites and customers’ refineries around the world.

In this revamp series, we will explore the solutions that are proving most popular in this new reality by focusing on six technology applications, example case studies and interviews with our global revamps experts. We hope they provide insights that help your revamps journey.

#### Discover How

[Shell Catalysts & Technologies increased diesel yield at SASREF](#)

#### Read How

[Shell Catalysts & Technologies increased refining capacity at Petrobras](#)

#### Take the Next Step

[Schedule a Revamps Consultation](#)



#### About the Author

Nick leads Shell’s Technology Licensing and Services business.

He has been in the industry for 25 years in a variety of roles including site operations, project management, consultancy, technology delivery and commercial management.

Nick’s passion lies in finding creative and integrated solutions with customer value at the heart of everything he does.

With the world’s need for cleaner energy for the future, he is focused on bringing technology solutions to achieve net zero carbon results.