

### REFINING

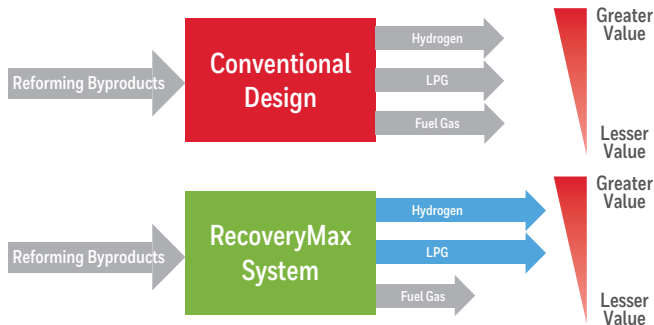
# RecoveryMax™ LPG Recovery Process Solution for CCR Platforming

A new LPG and Hydrogen Recovery System that enhances value to the CCR Platforming Process. Obtain greater value for Process Byproducts.

### Background

High yield byproducts generated by the CCR Platforming process for Motor Fuel or Aromatics production can be high value secondary revenue streams for the plant. UOP offers RecoveryMax system to monetize the benefit of these high value byproducts and increase the overall profitability of the plant. Additionally, nearby users of Hydrogen and LPG can take advantage of the increased production of these products.

### Maximizing the Value of Reforming Byproducts with UOP RecoveryMax



### RecoveryMax Advantages

Catalytic reforming allows refiners to convert straight run naphtha into higher octane product for motor fuel or aromatic rich reformate for an aromatics complex. In catalytic reforming, secondary byproducts are generated including hydrogen, LPG, and fuel gas. Of these byproducts, the lowest value byproduct is generally fuel gas.

UOP's RecoveryMax system allows 95% recovery of hydrogen and >85% LPG recovery by purifying more of these byproducts and not diverting them to fuel gas. This is a recovery increase of 5% for Hydrogen and 30% for LPG compared to the conventional design.

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RecoveryMax is supplied as a modular system using proprietary equipment supplied by UOP. These include the UOP PSA system to purify hydrogen and the UOP PolySep™ membrane to purify hydrocarbon from the PSA tailgas.

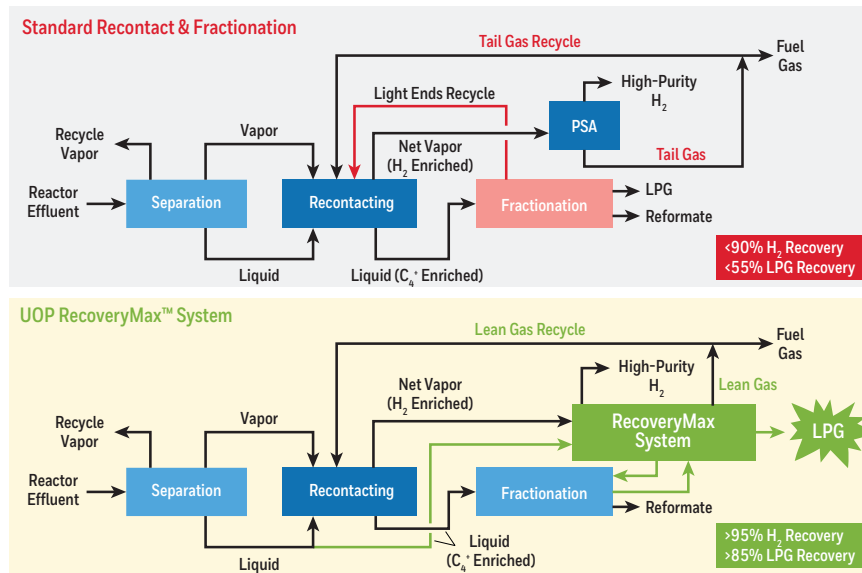
### Example Economics for a 30,000 BPSD reforming unit with 2017 US Gulf Coast basis (\$MMUSD)\*

Incremental Capital Investment	\$19.00
Annual Utility Investment	\$1.13
Annual Incremental LPG Production	\$8.59
Annual Incremental Hydrogen Production	\$5.60
NPV (20-yr, 30% Disc Rate)	\$56.64
IRR (20-yr)	38%

### Revamp Opportunities of Existing Units

Revamps of existing reforming units to take advantage of RecoveryMax are possible with minimal equipment replacement. An evaluation of the existing equipment constraints through a revamp feasibility study is needed to determine what areas of the unit will need to be reconfigured.

## Standard Recontact and Fractionation Section Configuration as Compared to UOP RecoveryMax Configuration



### Modular Delivery Advantages

The UOP RecoveryMax system is supplied as a modular offering. There are many benefits to modular systems over conventional “stick built” designs including:

- **Quality** – the technical “know how” from vendors who specialize in building modules reduces the likelihood of downstream performance issues. Also, testing of the modules at the fabrication site reduces the likelihood of failure or underperformance at site
- **Schedule** – Typically modular systems are constructed inside fabrication shops whereas stick built designs are constructed in the field. The likelihood of delays due to weather are considerably less for modular systems
- **Procurement** – if the operating site is in a remote location, it can be challenging to get needed supplies and labor to site. Modular systems have the advantage of having access to needed supplies and materials. Once the module is constructed and mechanically complete, it is shipped to site

#### For more information

[www.uop.com](http://www.uop.com)

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