



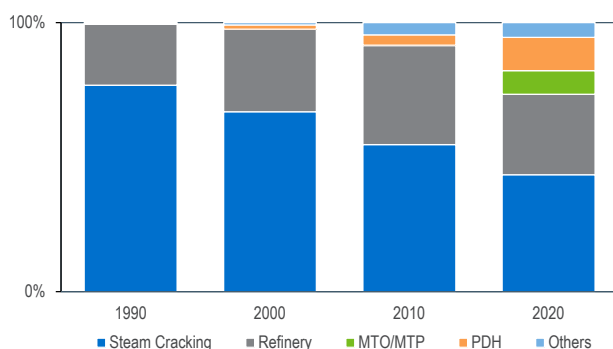
## PERP Report 2016S1: Propane Dehydrogenation Technologies

**“Propane Dehydrogenation Technologies” is one in a series of reports published as part of the 2016 Process Evaluation/Research Planning (PERP) Program.**

### Report Overview

Propylene demand has primarily been met with co-product propylene supplied from steam crackers for ethylene production, supplemented by off-gas co-product from the fluid catalytic cracking (FCC) process in oil refineries. Up to about 2000, steam cracking and recovery from FCC off-gas were sufficient to meet global propylene demand. Since then, however, increasing on-purpose propylene supplies have been required as propylene demand growth outpaced ethylene demand. Combined with abundant global propane supplies, propane dehydrogenation (PDH) has emerged as a dominant on-purpose propylene technology.

### PRODUCTION PROFILE FOR PROPYLENE



This PERP report provides an overview of the five PDH technologies offered for license. They utilize three very different approaches to dehydrogenation, with three licensors offering variations on fixed bed technology, while one each have processes based on moving bed and fluid bed technology.

The following issues are addressed in the report:

- What are the differences between the PDH technology offerings and who are the major licensors?
- Who owns the PDH plants in operation across the globe today, and what are the capacities of these plants?
- How does the prevailing low oil price environment impact the economic viability of PDH projects and operations?
- Which technology offerings provide the lowest cost of production, and which regions in the world provide attractive investment opportunities?

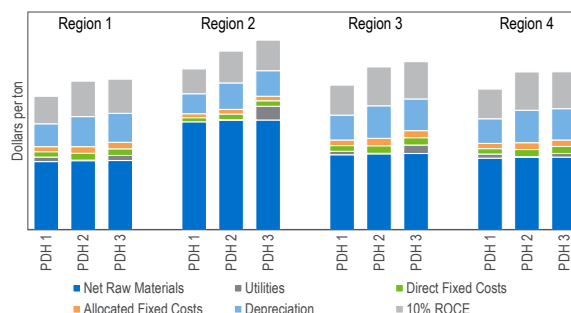
### Developing Technologies

Since the first PDH plant installation in 1990, PDH technology has been dominated by two major licensors. This report covers a new technology offering developed for propane dehydrogenation, including cost of production comparisons to existing technology licensors.

### Process Economics

Detailed cost of production estimates for commercial and developing PDH technologies are presented. A comparison of fixed bed, moving bed, and fluid bed technologies in different regions of world provide insight into the advantages and disadvantages of each technology based on a common PDH design basis developed to reflect a world-scale installation.

### REGIONAL COST OF PRODUCTION COMPARISONS



### Commercial Market Review

Global propylene consumption in 2015 was 95 million tons with key propylene applications dominated by polypropylene, followed by diverse propylene derivative products such as propylene oxide, acrylonitrile, cumene, acrylic acid, oxo-alcohols, and isopropanol. By the end of 2016, Nexant estimates global propylene consumption to reach nearly 100 million tons supported by strong regional growth in the Asia Pacific region. The PERP report provides an overview of the supply, demand, and trade of propylene on both a global and regional basis including recent business and capacity development in propane dehydrogenation.

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### Corporate Headquarters

Tel: +1 415 369 1000  
101 2nd St Suite 1000  
San Francisco  
CA 94105-3651  
USA

### Americas

Tel: +1 914 609 0300  
44 S Broadway, 4th Floor  
White Plains  
NY 10601-4425  
USA

### Europe, Middle East & Africa

Tel: +44 20 7950 1600  
1 King's Arms Yard  
London EC2R 7AF  
United Kingdom

### Asia Pacific

Tel: +662 793 4600  
22nd Floor, Rasa Tower I  
555 Phahonyothin Road  
Kwaeng Chatuchak  
Khet Chatuchak  
Bangkok 10900  
Thailand

