



IHS Markit®

# North American Propylene Market

Six key trends to watch



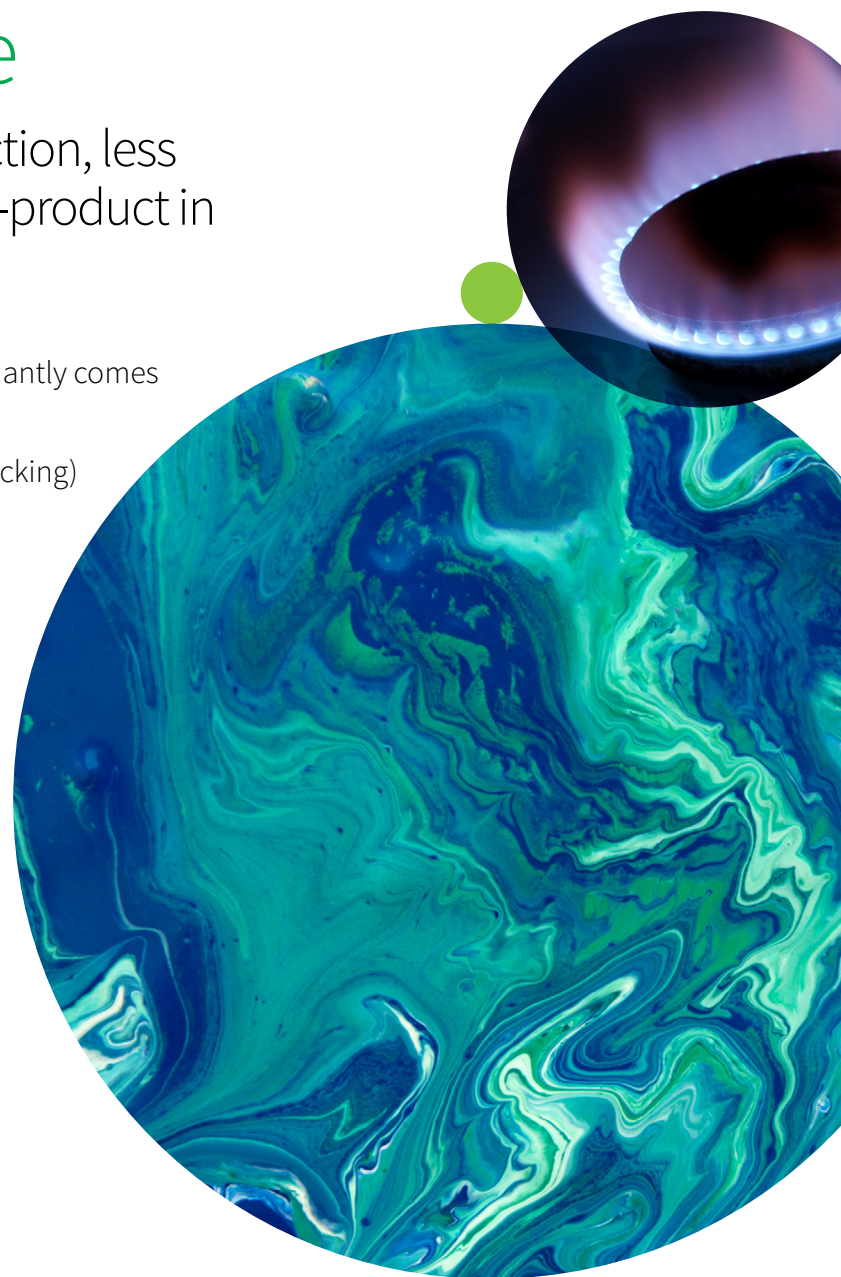
# Production Decline

Due to shale gas and tight oil production, less propylene is being produced as a co-product in steam cracking for ethylene.

The production of propylene in North America predominantly comes from two sources:

- as a co-product in ethylene production (via steam cracking)
- as a by-product of fuel production (refining)

Due to the shale gas phenomenon, the feedstock for steam cracking (ethylene production) is shifting to “lighter” ethane feeds. These lighter feeds produce less propylene as a co-product.



# New Capacity

## New Capacity

There is a need to build new on-purpose propylene capacity and propane dehydrogenation is favored.

Given the strong demand growth for propylene derivatives driven by urbanization of emerging countries, the demand growth rate for propylene has exceeded the ability of steam crackers and refineries to supply. Thus, on-purpose production is needed to fill the supply gap.

Fortunately, because of shale gas, there is increased availability of propane for use as a chemical feedstock. Propylene can be produced by a process called “propane dehydrogenation” (PDH), which converts propane to propylene on-purpose. Adding PDH units in North America is a viable option to produce sufficient propylene.

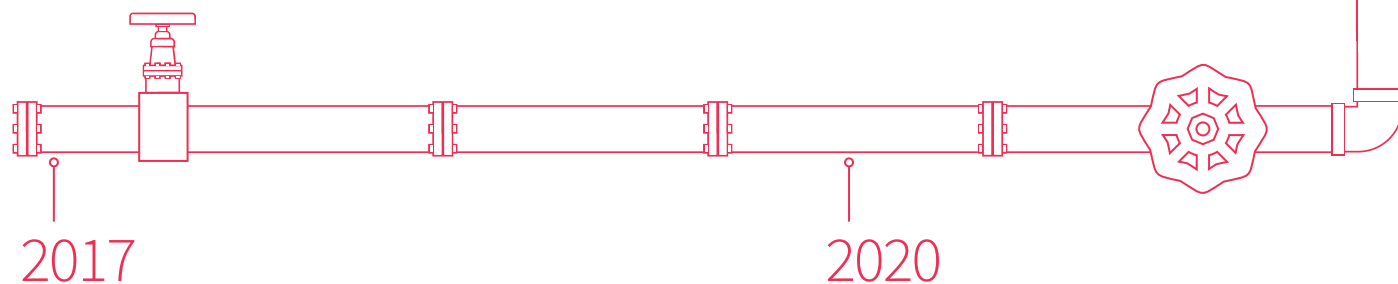
Already, there are three PDH producers already in operation in NAM (Flint Hills – Houston, TX, Dow – Freeport TX, Enterprise – Mont Belvieu, TX) with one additional PDH project reaching approval (FID) – Interpipeline – Alberta, CAN.

Many other companies, such as Pembina, Enterprise, LyondellBasell, and Formosa are considering adding PDH capacity to increase the supply of propylene in North America.

# Infrastructure Changes

Changes to propylene pipeline infrastructure  
(both the grade and direction of flow).

Infrastructure Changes



In 2017, the North Dean pipeline was converted from refinery grade propylene service to polymer grade propylene service affecting consumers south of the Houston area. The Lou-Tex pipeline currently ships chemical grade propylene from Louisiana to Texas.

In 2020, this pipeline will change service to carry polymer grade propylene instead. When the switch occurs, it will affect what grade of propylene producers in Louisiana and Texas produce, as well as the supply options for many derivative producers.



# Refinery Based Propylene

Changing dynamics of refining economics and its impact on refinery based propylene.

Propylene can be modified (via alkylation or dimerization) to make a chemical used in fuels, or added to LPGs. The economics of using propylene in fuels vs. using it in chemicals will vary based on geographic location and pricing. Some amount of propylene can “swing” between fuel and chemical end-uses.

As the refining sector first addresses new requirements for bunker fuel for compliance with IMO in 2020 and later positions itself as the growth in transportation fuel slows (peak oil demand), propylene co-production will be affected.



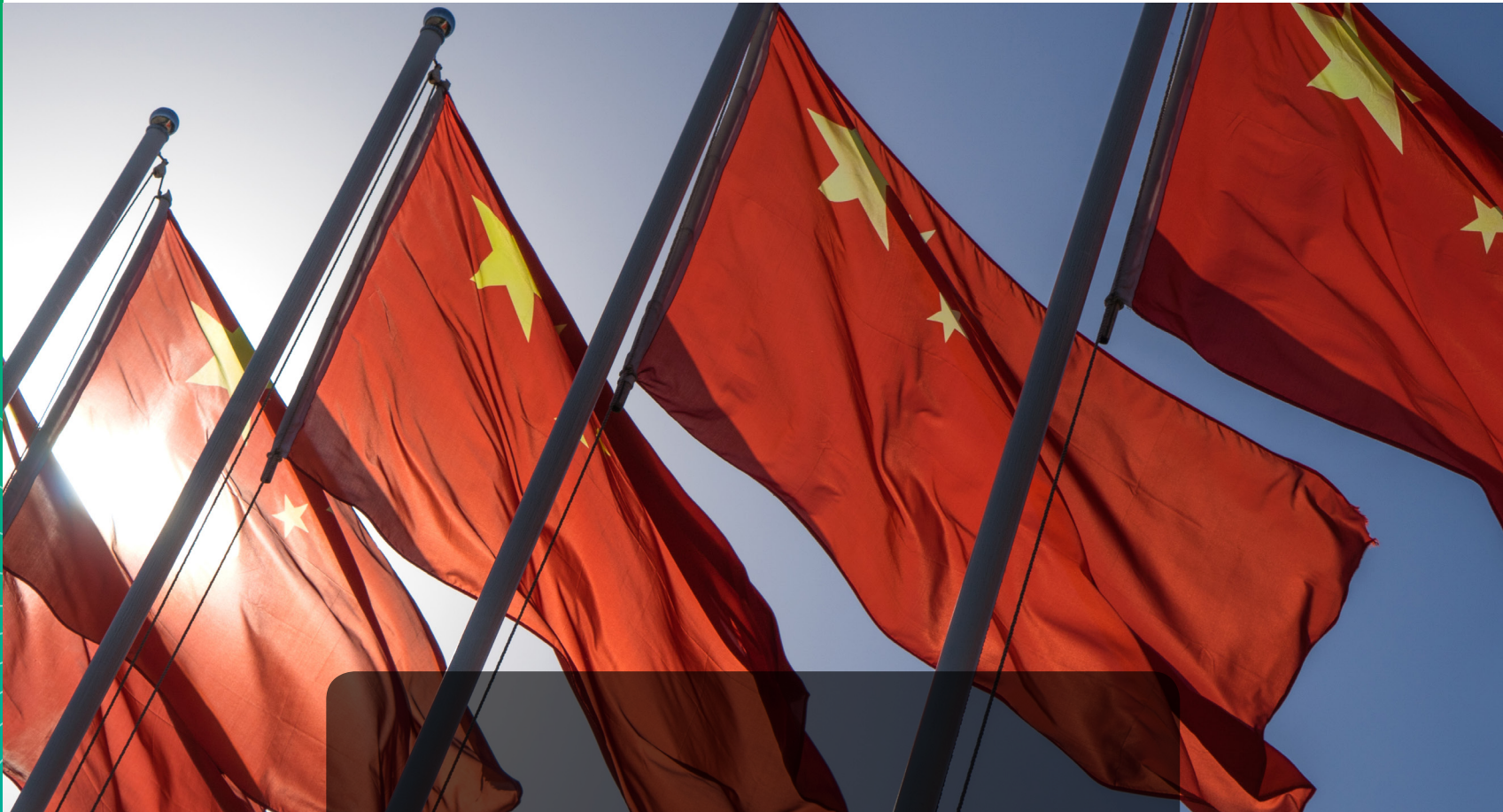
# China's Self-Sufficiency

Impact of propylene capacity buildup in China.

In China, there is overwhelming planned capacity additions for both PDH units and coal-to-olefin (CTO) units as China pursues self-sufficiency in the propylene value chain.

This report will discuss the impact of the build-up of China's propylene chain on North America.

China's Self-Sufficiency



# Derivative Capacity Additions

## Addition of propylene derivative capacity – When? Where?

With the changes in pipeline production and the addition of on-purpose propylene production (via PDH), there is an opportunity to add derivative capacity (propylene, oxo-alcohols, etc.).

It is important to understand where, when, and how much derivative capacity could be added.

Derivative  
Capacity Additions





# North America Propylene Supply Study

Structural shifts in North America's propylene supply and market dynamics have occurred during recent years and factors influencing these changes are continuing to have a significant impact. The North America Propylene Supply Study from IHS Markit will highlight and address these changes and key strategic issues facing the propylene industry.

North America  
Propylene Supply



## Strategic Issues

- Shale Gas/Tight Oil Impact on Olefins
- On-Purpose Capacity
- Expansion of Propylene Export Capability
- Changes to Pipeline Infrastructure
- Propylene Derivative Additions
- Impact of Changes in the Refining Sector
- Massive Chinese Propylene Investment



## North America Producer Profiles





## Prices

- Mechanisms
- Energy Forecast through 2027
- Propylene Price Forecast through 2027



## Propylene Technology Review

- Description of Major Technologies Including Process Flow Diagrams
- Economic Snapshots all Major Technologies for Propylene Production



## Trade

- Discussion of Propylene Trade
- Tables of Net Equivalent Trade, Imports, Exports
- North America, Canada, Mexico, United States



## Distribution

- Definition of Propylene Trade Areas (PTA)
- Inter-PTA trade grids, PTA production and consumption, PTA supply and demand
- Polymer-Grade, Chemical-Grade, and Refinery-Grade propylene integration by PTA
- Steam Cracker and PDH  
Propylene Producers' Capacity and Logistics Capabilities
- Refinery Propylene Producers' Capacity and Logistics Capabilities
- Propylene Export Terminals



## Appendices

- Production Location Maps
- Capacity Tables
- PG/CG Integration Tables
- RGP Integration Tables

# How We Can Help

## **NAM Propylene Producers**

- Anticipate where and when propylene capacity will expand
- Understand specific dynamics of the PTAs where their plants are located and how the region interacts with other regions
- Third-party analysis on changes in pipelines, trade, fuel vs. chemicals

## **NAM Propylene Derivative Producers**

- Determine where and when derivative capacity can be added
- Third-party analysis on how trends in NAM propylene will affect derivatives
- Information on chemical/polymer grade propylene split (not available elsewhere)

## **Global Propylene Players (Producers and Consumers)**

- Understand the complex dynamics of the North America propylene market
- Plan for changes upcoming in NAM propylene markets
- Understand how regional changes in North America will affect imports and exports to other regions

### Financial Institutions in EMEA and APAC

- How will changing NAM propylene market affect producers/users of propylene in EMEA and APAC where most of the propylene still comes from naphtha crackers?
- Are there opportunities for investments in propylene related infrastructure like pipelines and PDH units here and elsewhere?
- Will companies in EMEA/APAC close or sell propylene related assets there because of high cost and build them in NAM?
- Are there opportunities for APAC/EMEA companies to invest here due to the changes in our propylene supply?
- In addition, the changing propylene market in North America could have similar effects on world markets as the changes in our ethylene supply has

How We Can Help



# Project Team

IHS Markit has earned a reputation within the petrochemical industry for its ability to build upon its extensive models and databases and to provide meaningful forecasting and strategic planning services to its clients. Looking past the “numbers” has allowed IHS Markit to not only provide clients with short-term solutions, but to also become a valuable partner in longer-term strategic planning with an eye to the global petrochemical picture.

Over three decades in the business of petrochemical consulting, IHS Markit has developed the most comprehensive databases of supply/demand that are available to the industry, providing a solid base of information from which to build.



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