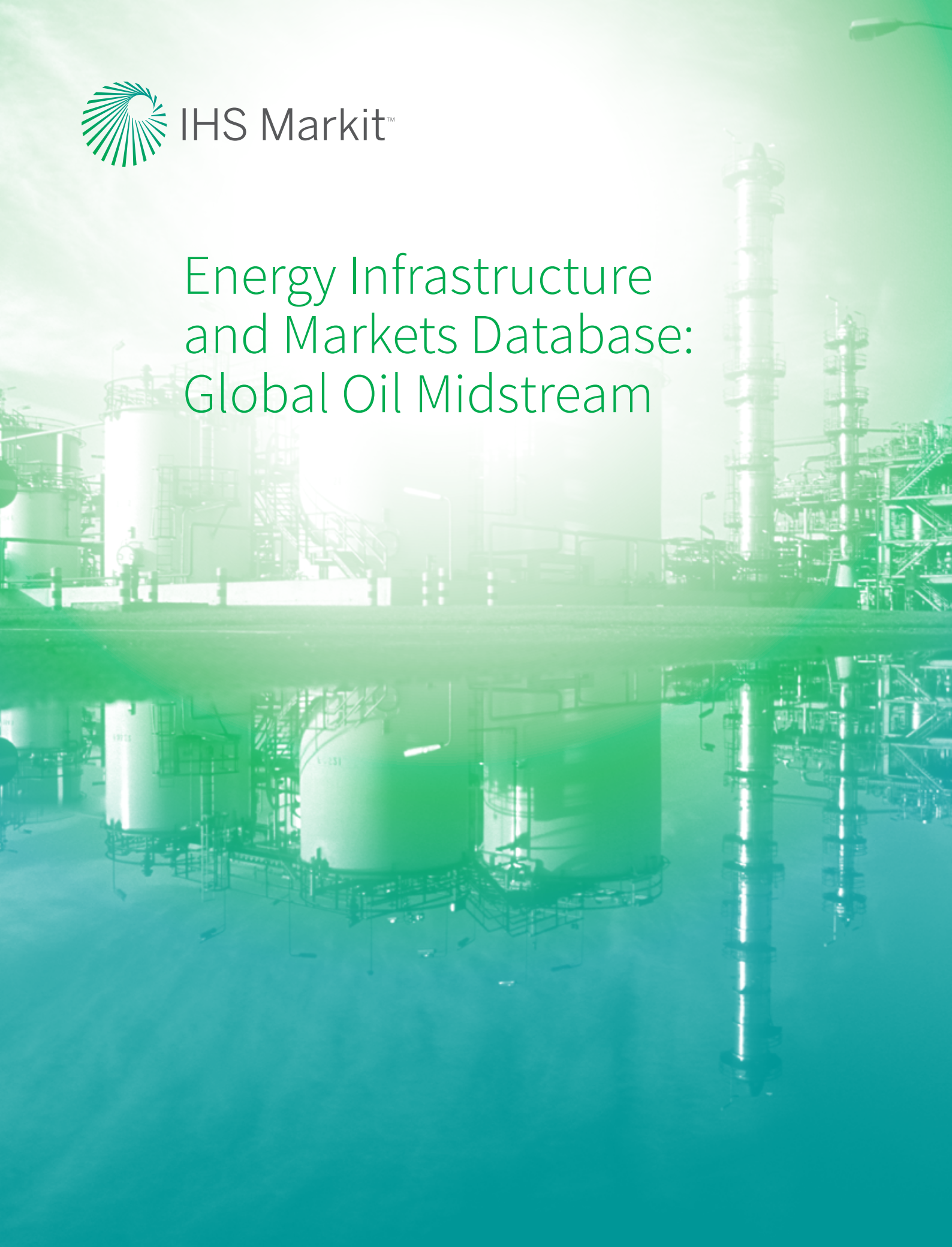




IHS Markit™

Energy Infrastructure and Markets Database: Global Oil Midstream



Comprehensive infrastructure data for strategic analysis, investment planning and decision support

In response to clients' needs to track refinery developments to best capitalize on opportunities created by the increasingly interconnected markets, IHS Markit has developed the Global Refining Database.

Effective market positioning in the volatile petroleum products market requires close monitoring of the pace of refinery and biofuels investments and their impact on regional as well as global product balances. IHS is tracking refinery projects on a daily basis, and with internet access to the IHS Global Refining Database, the planned crude oil distillation and upgrading capacity, current construction status and online dates for the projects can be viewed. For each planned and existing refinery based on its configuration, the production capacity by major product (gasoline, naphtha, jet kerosene, diesel/gasoil, residual fuel oil and LPG) is provided for the 1987-2020 time period. We also provide an IHS view of which projects will come online, likely timetable and associated production capacity by product.

IHS's Global Refining Database builds on IHS's Energy Infrastructure and Markets Database suite of products, enabling clients to view refinery sector developments within the context of the oil and petroleum products infrastructure.

IHS's Global Refining Database provides critical information and insight into:

What are competitor refinery investment plans and progress to date? Refinery processing capacity, product slate trends and related infrastructure with current construction status for new projects can be queried and displayed on a company-by-company and refinery-by-refinery basis.

How will biofuels impact conversion capacity requirements?

Biofuels production capacity and proposed new units are provided by site. The potential impact on gasoline and diesel availability and thus the impact on refinery product slate and upgrading requirements can be assessed.

How will regional product balances be affected and impact trade flows?

The impact of changes in refining capacity and configuration on product production capacities are calculated and trends can be viewed on an individual refinery, country, regional or global basis.

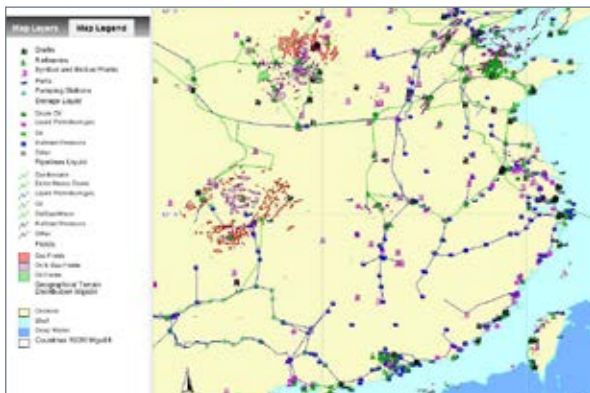
What are the logistical implications of refinery investment plans?

Grassroots refinery investments and expansions to existing facilities can be readily mapped and displayed within the context of the oil pipeline, port and storage infrastructure.

Where are the future sources of crude oil and what quality?

Clients also have the option to license IHS's E&P Essentials database which provides oil reserves, production and crude quality data by field. The combination of refinery and crude oil reserve data provides the critical commercial data needed to decide what type of refinery investment can be justified and where.

The upstream and midstream data available from IHS will enable your company to best position itself to access and process future crude sources and supply growth markets. Critical decision support data are provided for:



Chinese petroleum market infrastructure



Eastern Hemisphere Refinery Projects highlighted in black

Market Analysis – Refinery additions and conversion capabilities will determine regional product balances and be key factors to product price differentials, crack spreads and regional arbitrages.

Investment planning – Understanding the status of competing refinery and biofuels projects and the potential impact on product availability on a regional basis is critical to investment plans both with respect to where to invest and what type of processing

configuration will be required. The information is also fundamental to securing project financing.

Competitor intelligence – IHS’s extensive company ownership database structure enables clients to not only query for refinery capacity, but also the related pipeline and ports infrastructure. The E&P Essentials database option enables the analysis of company positions from the reserve level through to the available refinery with a forward view.

Common attributes for all facility types are plant name, operator, ownership structure, capacity by unit, online date by unit and location coordinates

As well as existing facilities, projects are captured along with their current status and milestones for key events. The content is outlined in the following:

Refineries:

- Capacity (1987-2020 in barrels per day and tons per year):
 - Crude distillation
 - Vacuum distillation
 - Reforming
 - Cyclic
 - Continuous catalytic
 - Semiregenerative
 - Other
 - Catalytic Cracking
 - Fluid
 - Resid
 - Other
 - Hydrocracking
 - VGO
 - Resid
 - Other
 - Coking
 - Delayed
 - Fluid
 - Other
 - Thermal Cracking
 - Visbreaking
 - Hydrotreating
 - Naphtha
 - Reformer Feed
 - Kerosene
 - Distillate
- Heavy Gasoil
- FCCU Feed
- Resid
- Alkylation
 - HF
 - Sulfuric
 - Other
- Isomerization
 - Butane
 - Pentane
 - Pentane/Hexane
- Polymerization
- MTBE
- ETBE
- TAME
- Lubes
- Asphalt
- BTX Extraction
- Hydrogen
 - Partial Oxidation
 - PSA (Pressure Swing Adsorption)
 - Steam Methane
 - Steam Naphtha
 - Other
- Sulfur

- Gasoline
- Naphtha
- Jet/kerosene
- Diesel/Gasoil
- Fuel Oil
- Maximum dead weight
- Tonnage

Biofuels/Synfuels:

- Type
 - Biodiesel
 - Bioethanol
 - CTG
 - GTL
- Intake capacity
- Production capacity:
 - Ethanol
 - Diesel
 - Naphtha
 - LPG
 - Other products
 - Total liquid product

Ports:

- Capacity Berths:
 - Berth name
 - Type of service
 - Operating status
 - Depth
 - Length
 - Maximum length overall
 - Maximum draught

Pipelines:

- Liquid Pipeline Content (Crude OIL, Refined Products, LPG, etc.)
- Route & length
- Diameter
- Capacity:
 - Time period
 - Reported
 - Estimated
 - Looping by segment

Pumping Stations

- Pumping Type
- Capacity

Storage Facilities

- Fluid Type
- Storage Type
- Capacity Liquid
- Number of tanks

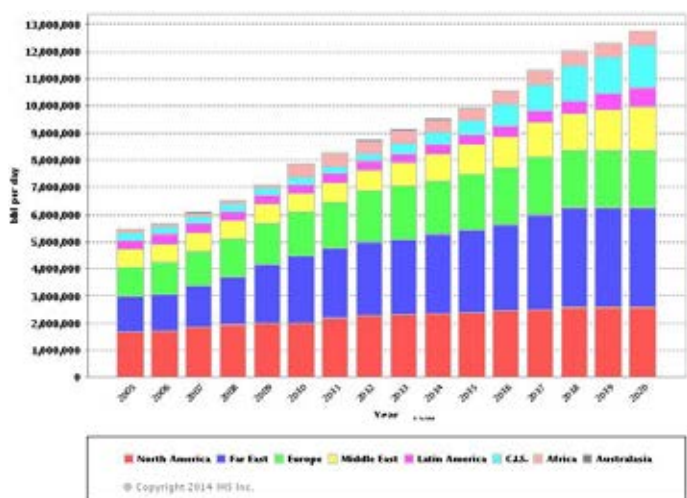
Floating Production Storage & Offloading (FPSO)

- Field name
- Port name

- Construction type (new or converted)
- Mooring Type
- Deadweight tonnage
- Depth
- Length
- Oil production maximum
- Oil storage capacity
- Gas processing capacity
- Gas injection capacity

Olefin Plants

- Capacity
 - Ethylene production
 - Feedstock usage by type (percentage)



Growth in Hydrocracking Capacity shown by region

Modules available in the Energy Infrastructure and Markets Database suite of products include:

E&P Essentials: Integrate reserves and production on field level, including development status for new projects along with details on hydrocarbon characteristics, for your supply planning

Gas & Power: Comprehensive unit level electric plant and gas storage level information

All infrastructure data is mappable and accessible through IHS GIS products.

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About IHS Markit

IHS Markit (Nasdaq: INFO) is a world leader in critical information, analytics and solutions for the major industries and markets that drive economies worldwide. The company delivers next-generation information, analytics and solutions to customers in business, finance and government, improving their operational efficiency and providing deep insights that lead to well-informed, confident decisions. IHS Markit has more than 50,000 key business and government customers, including 85 percent of the Fortune Global 500 and the world's leading financial institutions. Headquartered in London, IHS Markit is committed to sustainable, profitable growth.

For more information, contact our IHS Markit Midstream Experts

Cynthia Poynter
Senior Director
Midstream Energy
Product Management
T +41 22 721 1766
E cindy.poynter@ihsmarkit.com

Karl Lindstrom
Senior Manager Midstream – International
T +46 (0) 721 680 781
E karl.lindstrom@ihsmarkit.com

Prasun Chaudhury
Senior Product Manager – Americas
T +1 832 463 3049
E prasun.chaudhury@ihsmarkit.com