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Crude and Refined Products price forecast Methodology

ICIS
Independent Commodity Intelligence Services

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The ICIS raw materials global price forecasts are compiled monthly and can be accessed via the ICIS Analytics channel. Price forecasts cover the current month and the following 17 months, i.e. 18 months in total.

The basis for the crude price forecasts are as follows:

1. The Dated BFOE crude price forecast is derived from a model which incorporates two core components: (1) global crude oil, condensate and NGLs supply and refinery throughput balances, and (2) key market developments/'events'. In the months when key events are expected, this is the key driver of the model, whilst the supply/refinery throughput forecast drives the forecast during months when events are not expected.
2. ICIS produces three versions of the Dated BFOE price forecast (base, high and low):
   a) Base case: This is the main ICIS price forecast. It reflects what ICIS expects to happen in the market based on supply and demand fundamentals and the positive or negative impact of expected events on the price.
   b) High case: This is a set of monthly forecasts which reflect potential market events that could push the crude price higher. These events could be the same as those driving the base case, but with a different outcome. E.g. OPEC+ will meet to discuss production cuts (event), in our base case ICIS assumes that they agree to keep production at the same level, the high case considers the impact of a decision to cut production significantly. The high case could also contain potential events which are not included in other cases.
   c) Low case: this version employs the same methodology and principles as the high case, i.e. events are considered which could push the price of crude lower.
3. The WTI and Dubai crude price forecasts are derived by assessing the supply and demand dynamics, seasonality dynamics and expected events for each product, to form a series of spreads against the Dated BFOE price forecast. ICIS produces base, high and low case price forecasts for WTI and Dubai price following this methodology.

The basis for non-US refined products price forecasts are as follows:

1. All non-US refined products price forecasting models follow a similar methodology, taking into account an historic ratio with an upstream price and the price seasonality of the specific product.
2. Manual adjustments are then applied to these model outputs by the analyst, the value of which depends on expected key market developments in the given month.
3. The raw material product and respective upstream products are listed below:

Raw Material Product	**Upstream Product**	**Other Regional Forecasts**
Propane 3000 mt+ CIF NWE	Naphtha NWE	Western Med, Middle East Gulf
Butane 3000 mt+ CIF NWE	Propane NWE	Western Med, Middle East Gulf
Naphtha CIF NWE	Dated BFOE	Western Med, Middle East Gulf, Singapore, Japan
Gasoline Regular Unleaded CIF NWE	Dated BFOE	Western Med, Middle East Gulf, Singapore
Gasoil (EU) CIF NWE	Dated BFOE	Western Med, Singapore, Japan
Fuel Oil 3.5% CIF NWE	Dated BFOE	Western Med, Middle East Gulf, Singapore, Japan

4. For each raw material product, other regional price forecasts are also produced using models which have the same ratio and seasonality basis as outlined in points 1-2.

US refined products follow a similar methodology but with additional steps, as outlined below:

1. Refined product prices take into account the monthly average U.S. refiner crude acquisition costs (ARAC) and product margins.
2. Product margins are set by the monthly analysis of supply/demand fundamentals for each product covered, seasonal factors, historical prices, and upcoming market events.

3. Spot prices for gasoline, jet and ULSD are a differential to contract based on historical patterns. Spot reformulated blendstock for oxygenate blending (RBOB) and premium/mid-grade prices are forecast at differentials to spot regular, with a seasonal component added or subtracted. Spot heating oil is discounted off ULSD and also encounters some seasonal adjustment based on historical performance.
4. After setting the Gulf Coast HSFO price as a differential to spot Dubai crude, the remaining list of residual fuel oil prices are differentials to this market. New York HSFO is usually priced at a modest premium to the Gulf Coast while low sulphur fuel oil (LSFO) prices are premiums to HSFO prices in the Gulf Coast and New York Harbor markets. Seasonality, supply/demand fundamentals, and historical differential performance all play in forecasting LSFO prices.
5. For low sulphur vacuum gasoil (LVGO), the forecast is generated from the estimates for crude, gasoline, ULSD prices. The catalytic cracker product valuation of 70% gasoline/30% ULSD is calculated and LVGO is priced off this differential. Other factors that come into play are movements in crude oil and seasonality (cat cracker maintenance outages).

US NGL price forecasts follow a similar methodology to the US refined products but with additional steps, as outlined below:

1. Spot propane is forecast first, and is typically based on the ratio to Brent crude, with a seasonal component added in during the fall and winter months when LPG use is greatest. Historical ratios and supply/demand fundamentals also play a role in the magnitude of change in price ratio.
2. Normal butane prices during the fall and winter (September-February) are forecast as a ratio to gasoline. Historical ratios coupled with supply/demand fundamentals are taken into account. Spring and summer (March-August) prices are set based on supply/demand fundamentals and butane's relative cost position in the petrochemical feedstock market.
3. Isobutane prices are set as a differential to normal butane.
4. The forecast for spot purity ethane is set based on market fundamentals and the expectation for natural gas. The latter sets the cost floor for ethane and prices above fuel value shift depending on supply balance and the cost to transport incremental supply to the Gulf Coast demand centre. Spot mix grade prices are forecast at a discount to purity, based on historical valuations.

5. Natural Gasoline (Light Naphtha) prices are forecast as a ratio to gasoline and crude oil. Whole (full range) Naphtha prices also take into account a ratio to gasoline, although ICIS does monitor reformer economics, which caps the upside.

All prices are forecast in the currency they are assessed in. For spreads analysis, where the feedstock currency may differ from the product currency, exchange rates from www.xe.com are used for historical data series. For forecasted series, in these instances, an exchange rate from the month of analysis is used for the whole forecasted series.