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ARGUS NETBACK MODEL

Contents

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The most up-to-date Argus Netback Model methodology is available on www.argusmedia.com

Introduction

Argus uses a netback model to calculate netback values and netback margins for a range of marker crudes in northwest Europe, the Mediterranean, the US and Singapore. Netback margins indicate the incentive to refine more crude into products. They are calculated from a mathematical model, and do not indicate the real profitability of refining. The margins published are variable margins, and therefore do not take into account the fixed costs associated with refinery operations.

A netback value expresses the worth of a crude in terms of the value of products available from it. Each crude has a particular yield of products with a gross product worth, which depends on product prices and the refining process. Subtracting variable refining costs such as fuel costs from the gross product worth gives the refinery gate value of a crude. Subtracting freight costs then gives the netback value, or the worth of the products, "netted back" to the crude loading terminal. Subtracting the crude price from the netback value gives the netback margin.

To calculate a crude's refinery gate value, Argus uses Aspen PIMS™ a linear programming model that simulates the operations of a refinery. The model calculates the optimal yield of products to maximise the refinery gate value, according to spot product prices and within the constraints of a refinery configuration and a crude assay. The model's three variable components are therefore:

- the crude and product prices as published in the Argus market reports
- the refinery configuration and the constraints on individual product production
- the crude assay and the constraints on refining each crude

Argus publishes the marginal value of a refined barrel of crude, exclusive of fixed costs and without the unit capacity constraints of a particular refinery.

Aspen PIMS

Aspen PIMS has replaced the previous LP model developed for Argus. As part of the implementation, the model has been updated to take into account changes to refinery technology — in particular improvements to desulphurisation capability to meet tighter specifications in the gasoline and diesel pool and the addition of an MTBE plant model.

The new model also allows for the import of natural gas as a fuel when it is economically optimal to do so.

Crudes being valued

Details of the refinery models and constraints, the crude and product prices used as inputs and a history of the refinery gate values and netback values can be obtained from Argus.

Products

Refinery gate values are calculated by summing the value of the products produced by each refinery model and subtracting the cost of feedstock and blending inputs. The products produced by each model are assumed to meet to the specifications defined in the relevant Argus methodology.

Daily LPG, refined products, marine fuels, freight and natural gas price assessments; and weekly sulphur and methanol price assessments are used in the calculations.

Northwest Europe

LPG
- Butane ARA barges
- Propane ARA barges

See the Argus International LPG methodology

Refined products
- Fuel oil 1% 380cst NWE fob cargo
- Fuel oil 3.5% 380cst NWE fob cargo
- Gasoil diesel 10ppm German Rotterdam fob barge
- Gasoil heating oil German 50ppm Rotterdam fob barge
- Gasoline 10ppm non-oxy NWE cif
- Jet/kerosine NWE fob
- Naphtha 65 para NWE cif prompt, less clean cross UKCC 22k freight
- VGO 0.5% NWE barge
- VGO 2.0% NWE barge

See the Argus European Products methodology

Sulphur
- Sulphur dry bulk fob Mediterranean

See the Argus Sulphur methodology

Freight
- Dirty, Mideast Gulf-UKC/Med 280,000t
- Dirty, Cross UKC 80,000t
- Dirty, West Africa-UKC/Med 130,000t
- Dirty, Med-UKC 80,000t

See the Argus Tanker Freight methodology. Note: the Dirty, Med-UKC 80,000t rate is assessed for use in the Argus Netback Model and is not published in Argus Tanker Freight. The price is assessed in the same way as other similar rates contained in Argus Tanker Freight.

Natural gas and methanol (inputs)
- Natural gas TTF, day-ahead, $/mn Btu
- Methanol Rotterdam fob EQCP (European Quarterly Contract Price)

See the Argus European Natural Gas methodology and the Argus Methanol methodology

Mediterranean

LPG
- Butane fob Mediterranean coasters
- Propane fob Mediterranean coasters

See the Argus International LPG methodology

Refined products
- Fuel oil 1% 380cst fob west Mediterranean cargo
- Fuel oil 3.5% 380cst fob west Mediterranean cargo
- Gasoil diesel 10ppm French fob west Mediterranean
- Gasoil heating oil French fob west Mediterranean
- Gasoline 95r 10ppm fob west Mediterranean
- Jet/kerosine fob west Mediterranean
- Naphtha 65 para fob west Mediterranean
- VGO 0.5% cif central Mediterranean
- VGO 2.0% cif central Mediterranean

See the Argus European Products methodology

Sulphur
- Sulphur dry bulk fob Mediterranean

See the Argus Sulphur methodology

Freight
- Dirty, Cross Med fuel oil 30,000t

See the Argus Tanker Freight methodology.

Natural gas and methanol (inputs)
- Natural gas TTF, day-ahead, $/mn Btu
- Methanol Rotterdam fob EQCP (European Quarterly Contract Price)

See the Argus European Natural Gas methodology and the Argus Methanol methodology

Asia-Pacific

LPG
- Butane Japan cargo
- Propane Japan cargo

See the Argus International LPG methodology

Refined Products
- Naphtha Singapore fob
- Gasoline 95r Singapore
- Jet/kerosine Singapore
- Gasoil 0.005% Singapore prompt
- Gasoil 0.05% Singapore prompt
- Fuel oil 3.5% 180 cst cargo Singapore
- Fuel oil 3.5% 380 cst cargo Singapore

See the Argus Asia-Pacific Products methodology

Sulphur
- Sulphur dry bulk fob Middle East spot

See the Argus Sulphur methodology

Freight
- Dirty, Indonesia-Japan 80,000t
- Dirty, Mideast Gulf-East (double hull) 270,000t
- Dirty, Kozmino-Singapore 100,000t

See the Argus Tanker Freight methodology

Natural gas and methanol (inputs)
- LNG des southeast Asia (ASEA) half-month one
- Methanol cfr southeast Asia

See the Argus LNG Daily methodology and the Argus Methanol methodology

US Gulf coast

LPG
- Propane Mt Belvieu LST (LDH) month
- Butane refinery grade Mt Belvieu LST month

See the Argus NGL Americas methodology

Refined products
- Diesel ULSD 62 fob USGC waterborne
- Gasoline 87 conv Colonial M pipe fob lowest RVP not 7.8 or 7 wtd avg cycle
- RVP value gasoline 87 conv Colonial M pipe fob lowest RVP not 7.8 or 7.0 wtd avg cycle
- Heating oil USGC waterborne fob
- Kerosine USGC waterborne fob
- Naphtha full-range USGC waterborne del
- VGO 0.5% USGC barge del vs WTI
- VGO 2% USGC barge del vs WTI

See the Argus US Products methodology

Marine fuels
- Fuel oil bunker 3.5% 380 cst ex-wharf Houston used with fuel oil 1% cif New York Harbor barge and fuel oil 3% dob New York Harbor barge to derive a low-sulphur fuel oil import price at the US Gulf coast

See the Argus Marine Fuels methodology and the Argus US Products methodology

Sulphur
- Sulphur dry bulk fob US Gulf

See the Argus Sulphur methodology

Petroleum Coke
- Petroleum Coke USGC fob 4.5% sulphur 40 HGI

See the Energy Argus Petroleum Coke methodology

Freight
- Dirty, Mideast Gulf-US Gulf 280,000t
- Dirty, Caribbean-USGC 50,000t
- Dirty, West Africa-US Gulf 130,000t

See the Argus Tanker Freight methodology

Natural gas and methanol (inputs)
- Natural gas Henry Hub, day-ahead
- Methanol barge US Gulf coast

See the Argus Natural Gas Americas methodology and the Argus Methanol methodology

US west coast

LPG
- Propane Mt Belvieu LST (LDH) month
- Butane refinery grade Mt Belvieu LST month

See the Argus NGL Americas methodology

Refined products
- Naphtha full-range USGC waterborne del
- Gasoline suboctane LA pipe fob month
- RVP value gasoline suboctane LA pipe fob month
- Jet fuel LA pipe fob wtd avg month
- Diesel CARB ULSD fob LA pipe wtd avg month
- Heating oil USGC waterborne fob
- VGO 0.5% USGC barge del vs WTI
- VGO 2% USGC barge del vs WTI

Marine fuels
- Fuel oil bunker 0.5% 380 cst ex-wharf Los Angeles used with fuel oil 1% cif New York Harbor barge and fuel oil 3% dob New York Harbor barge to derive a low-sulphur fuel oil import price at the US West coast

See the Argus Marine Fuels methodology and the Argus US Products methodology

Sulphur
- Sulphur dry bulk fob US west coast

See the Argus Sulphur methodology

Petroleum Coke
- Petroleum Coke USWC fob 2.0% sulphur 45 HGI

See the Energy Argus Petroleum Coke methodology

Freight
- Ecuador-US west coast 50,000t

Natural gas and methanol (inputs)
- Natural gas SoCal Citygates, day-ahead
- Methanol barge US Gulf coast

See the Argus Natural Gas Americas methodology and the Argus Methanol methodology

Timing

Netbacks are calculated according to a regional publishing schedule, available at www.argusmedia.com. On days on which underlying LPG, refined products, marine fuel or natural gas price assessments are not published for a given region, no netbacks are calculated for that region. When sulphur, freight, petroleum coke or methanol price assessments are not published for a given region, netbacks are calculated and published using the most recent available assessments.

Key Processes modelled								
Process	Northwest Europe		Mediterranean		Asia-Pacific		US Gulf coast/US west coast	
	Complex	Simple	Complex	Simple	Complex	Simple	Complex	Simple
Atmospheric Distillation	x	x	x	x	x	x	x	x
Vacuum Distilation	x	x	x	x	x	x	x	x
Visbreaker	x	x	x	x	x	x	x	x
Fluid catalytic cracker	x		x		x		x	
Coker							x	
Hydrocracker			x				x	
Hydrogen Plant	x	x	x	x			x	x
Desluphurisation	x	x	x	x	x	x	x	x
Continuous cat reformer	x	x	x	x	x	x	x	x
Isomerisation (TIP)	x	x	x	x	x	x	x	x
Alkylation	x	x	x	x	x	x	x	x
MTBE	x	x	x	x	x	x	US W. Coast complex only	x