

## **MARKETS AND PROFITABILITY**

# **Profitability and Price Forecast: Refined Products- 2021**

Global

November 2021



This Report was prepared by NexantECA, the Energy and Chemicals Advisory company ("NexantECA"). Except where specifically stated in this Report, the information contained herein is prepared on the basis of information that is publicly available, and contains no confidential third party technical information to the best knowledge and belief of NexantECA. The information has not been independently verified or otherwise examined to determine its accuracy, completeness or financial feasibility. Neither NexantECA, Subscriber nor any person acting on behalf of either shall have any liabilities for any loss or damage arising from or connected to the use of any information contained in this Report. NexantECA does not represent or warrant that any assumed conditions will come to pass.

The Report is for Subscriber's internal use only and shall be kept strictly confidential. The Report should not be otherwise reproduced, distributed or used without first obtaining prior written consent by NexantECA. Each Subscriber agrees to use reasonable effort to protect the confidential nature of the Report.

Copyright © by NexantECA (BV) Ltd. 2021. All rights reserved.



## Contents

<b>1</b>	<b>Executive Summary .....</b>	<b>1</b>
1.1	Introduction.....	1
1.2	Scenarios .....	4
1.3	Refining Margins .....	5
1.4	Price Projections .....	7
1.5	Key Petroleum Product Price Trends.....	10
1.5.1	Gasoline .....	10
1.5.2	Naphtha.....	12
1.5.3	Diesel/Gasoil .....	14
1.5.4	Residual Fuel Oil.....	16
<b>2</b>	<b>Assumptions and Forecast Methodology .....</b>	<b>19</b>
2.1	Introduction.....	19
2.2	Scenarios .....	20
2.3	Crude Oil .....	25
2.3.1	Crude Oil Price Markers .....	25
2.3.2	Crude Oil Scenarios .....	25
2.3.2.1	Medium Crude Oil Price .....	27
2.3.2.2	High Crude Oil Price .....	27
2.3.2.3	Low Crude Oil Price .....	27
2.3.3	Crude Oil & Refined Products Price Basis .....	29
2.4	Regional Crude Oils .....	30
2.5	Price Setting Mechanisms.....	31
2.5.1	Refining Configurations .....	31
2.5.1.1	Hydroskimming Refinery Configuration .....	32
2.5.1.2	Complex Cracking Refinery Configuration.....	34
2.5.1.3	Deep Conversion/Coking Refinery.....	36
2.5.1.4	Refinery Yields .....	38
2.5.2	Refining Industry Margin Drivers .....	38
2.5.2.1	Margin Floors .....	39
2.5.2.2	Margin Ceilings .....	39
2.5.3	Pricing Relationships.....	39
2.5.3.1	Inter-Product Price Relationships .....	39
2.5.3.2	Inter-Regional Price Relationships.....	39
<b>3</b>	<b>Refinery Margins .....</b>	<b>41</b>
3.1	Key Overview and Key Trends.....	41
3.2	United States .....	47
3.2.1	Historical Oil Refinery Profitability .....	47
3.2.1.1	Refinery Margin Projections.....	51
3.3	Western Europe .....	53
3.3.1	Historical Oil Refinery Profitability .....	53
3.3.2	Refinery Margin Projections .....	56



3.4	Asia Pacific .....	58
3.4.1	Historical Oil Refinery Profitability .....	58
3.4.2	Refinery Margin Projections .....	62
<b>4</b>	<b>Refined Products.....</b>	<b>65</b>
4.1	Introduction.....	65
4.2	Gasoline .....	71
4.2.1	Global Overview .....	71
4.2.2	United States .....	73
4.2.3	Western Europe .....	77
4.2.4	Asia Pacific.....	79
4.3	Naphtha.....	82
4.3.1	Global Overview .....	82
4.3.2	United States .....	84
4.3.1	Western Europe .....	86
4.3.2	Asia Pacific.....	88
4.4	Diesel/Gasoil .....	91
4.4.1	Global Overview .....	91
4.4.2	United States .....	93
4.4.3	Western Europe .....	97
4.4.4	Asia Pacific.....	100
4.5	Jet Fuel/Kerosene .....	103
4.5.1	Global Overview .....	103
4.5.2	United States .....	105
4.5.3	Western Europe .....	107
4.5.4	Asia Pacific.....	109
4.6	Residual Fuel Oils .....	111
4.6.1	Global Overview .....	111
4.6.2	United States .....	113
4.6.3	Western Europe .....	117
4.6.4	Asia Pacific.....	120
<b>5</b>	<b>Natural Gas .....</b>	<b>122</b>
5.1	Price Forecast Methodology .....	122
5.2	United States .....	123
5.2.1	Price-Setting Mechanisms .....	123
5.2.2	Historical Pricing Trends .....	123
5.2.3	Price Outlook.....	124
5.3	Western Europe .....	126
5.3.1	Historical Pricing Trends .....	126
5.3.2	Pricing Outlook.....	127
<b>6</b>	<b>Natural Gas Liquids (NGLs) .....</b>	<b>128</b>
6.1	Introduction.....	128
6.1.1	Price-Setting Mechanism and Global LPG Trading Centres .....	128
6.1.2	Saudi Arabia/Arabian Gulf.....	129



6.2	Ethane .....	130
6.2.1	United States.....	130
6.3	Propane.....	133
6.3.1	Propane Global Overview .....	133
6.3.2	United States.....	134
6.3.3	Western Europe .....	136
6.3.4	Asia Pacific.....	139
6.4	Butane .....	141
6.4.1	Global Overview .....	141
6.4.2	United States.....	142
6.4.3	Western Europe .....	144
6.4.4	Asia Pacific.....	146

## Appendices

No table of contents entries found.

## Figures

Figure 1	Crude Oil Price Scenarios .....	4
Figure 2	Refining Margin Forecasts – Medium Oil Scenario.....	6
Figure 3	United States Refined Product Price Spreads v/s Crude Oil .....	8
Figure 4	Western Europe Refined Product Price Spreads v/s Crude Oil .....	9
Figure 5	Singapore Refined Product Price Spreads v/s Crude Oil.....	9
Figure 6	Global Premium Gasoline Prices .....	11
Figure 7	Global Naphtha Prices.....	12
Figure 8	Global Gasoline & Naphtha Price Differentials.....	13
Figure 9	Global Diesel/Gasoil Prices .....	14
Figure 10	Global Diesel & Gasoline Price Differentials .....	15
Figure 11	Global HSFO Prices .....	17
Figure 12	Global Diesel/Gasoil & HSFO Price Differentials .....	18
Figure 13	Crude Oil Price Scenarios .....	26
Figure 14	Simplified Flow Diagram of a Typical Hydroskimming Refinery .....	33
Figure 15	Simplified Flow Diagram of a Typical Complex Refinery .....	35
Figure 16	Simplified Flow Diagram of a Typical Deep Conversion Refinery .....	37
Figure 17	Typical Refinery Yields .....	38
Figure 18	Global Refining Margin Comparison – Medium Oil Scenario.....	41
Figure 19	Annual Changes in Global Refining Capacity and Oil Demand .....	43
Figure 20	U.S. Gulf Coast Refining Margins .....	47
Figure 21	United States Upgrading Cash Cost Margin .....	49
Figure 22	U.S. Refining Margin Forecasts – Medium Oil Scenario.....	51
Figure 23	U.S. Refinery Fuel Cost Advantage <sup>1</sup> .....	52
Figure 24	Refining Margins – North-West Europe.....	53
Figure 25	Upgrading Margins – North-West Europe .....	55
Figure 26	North-West Europe Refining Margin Forecasts – Medium Oil Scenario.....	57
Figure 27	Singapore Cash Cost Refining Margins .....	58



Figure 28	Upgrading Margins – Singapore.....	61
Figure 29	Singapore Cash Cost Refining Margins – Medium Oil Scenario.....	63
Figure 30	Topping/Visbreaking Margin - Singapore – Medium Oil Scenario .....	63
Figure 31	USGC Refined Product Prices and LLS Crude Oil Price .....	66
Figure 32	Western Europe Refined Product Prices and Brent Crude Oil Price .....	67
Figure 33	Singapore Refined Product Prices and Dubai Crude Oil Price .....	67
Figure 34	Global Premium Gasoline Prices .....	72
Figure 35	Regular Unleaded Gasoline Prices .....	74
Figure 36	Premium Unleaded Gasoline Prices .....	75
Figure 37	Premium Unleaded v/s Regular Unleaded Gasoline Prices.....	76
Figure 38	Western Europe Premium Gasoline Prices .....	78
Figure 39	Singapore Premium Gasoline Prices .....	81
Figure 40	Global Naphtha Prices.....	82
Figure 41	Global Gasoline & Naphtha Price Differentials.....	83
Figure 42	Light Virgin Naphtha Prices .....	84
Figure 43	U.S. Gulf Coast Gasoline & Light Naphtha Prices – Medium Oil Scenario.....	85
Figure 44	Western Europe Naphtha Prices .....	86
Figure 45	Western Europe Premium Gasoline & Naphtha Prices – Medium Oil Scenario .....	87
Figure 46	Singapore Naphtha Prices.....	89
Figure 47	Singapore Premium Gasoline and Naphtha Prices – Medium Oil Scenario .....	90
Figure 48	Global Diesel/Gasoil Prices .....	91
Figure 49	Global Gasoline & Diesel Price Differentials .....	92
Figure 50	United States Diesel Prices .....	93
Figure 51	No. 2 Heating Oil Price Scenario.....	94
Figure 52	No. 2 Heating Oil & Diesel Prices.....	95
Figure 53	Gasoline and Diesel Prices .....	96
Figure 54	Western Europe Diesel Prices .....	97
Figure 55	Western Europe Diesel & Gasoil Prices .....	98
Figure 56	Western Europe Gasoline and Diesel Prices .....	99
Figure 57	Asian Gasoil Prices .....	100
Figure 58	Singapore Gasoline and Diesel Prices.....	102
Figure 59	Global Jet Fuel/Kerosene Prices .....	103
Figure 60	Global Jet Fuel/Kerosene & Diesel/Gasoil Price Differentials .....	104
Figure 61	Jet Fuel/Kerosene Price Scenarios .....	105
Figure 62	Jet Fuel/Kerosene – No. 2 Heating Oil Price Difference .....	106
Figure 63	Western EuropeJet Fuel/Kerosene Prices .....	107
Figure 64	Jet Fuel & Gasoil Prices .....	108
Figure 65	SingaporeJet Fuel/Kerosene Prices .....	109
Figure 66	Kerosene & Gasoil Prices.....	110
Figure 67	Global HSFO Prices .....	112
Figure 68	Global Diesel/Gasoil & HSFO Price Differentials .....	112
Figure 69	High Sulphur Fuel Oil Price Scenarios .....	114
Figure 70	Heating Oil & High Sulphur Fuel Oil Prices – Medium Oil Scenario .....	114
Figure 71	Low Sulphur Fuel Oil Price Scenarios.....	115



---

Figure 72	LSFO & HSFO Prices – Medium Oil Scenario .....	116
Figure 73	Western Europe High Sulphur Fuel Oil Price Scenarios .....	117
Figure 74	Gasoil & High Sulphur Fuel Oil Prices – Medium Oil Scenario .....	118
Figure 75	Western Europe Low Sulphur Fuel Oil Price Scenarios .....	119
Figure 76	LSFO & HSFO Prices – Medium Oil Scenario .....	119
Figure 77	Singapore High Sulphur Fuel Oil Price Scenarios .....	120
Figure 78	Gasoil & High Sulphur Fuel Oil Prices – Medium Oil Scenario .....	121
Figure 79	U.S. East Coast Natural Gas <sup>1</sup> versus Fuel Oil Prices .....	124
Figure 80	Henry Hub Natural Gas Prices .....	125
Figure 81	U.S. East Coast Natural Gas <sup>1</sup> versus Fuel Oil Prices – Medium Oil Scenario .....	126
Figure 82	Ethane Price Scenarios .....	130
Figure 83	Ethane Price Relative to Natural Gas Value – Medium Oil Scenario .....	132
Figure 84	Ethane Price Trends – Medium Oil Scenario .....	132
Figure 85	Relative Value of Ethane – Medium Oil Scenario .....	133
Figure 86	Global Propane Prices – Medium Oil Scenario .....	134
Figure 87	Propane Price Scenarios .....	135
Figure 88	Propane Price Trends – Medium Oil Scenario .....	136
Figure 89	Relative Value of Propane – Medium Oil Scenario .....	136
Figure 90	Western Europe Propane Prices .....	137
Figure 91	Propane Price Influences – Medium Oil Scenario .....	138
Figure 92	Relative Value of Propane – Medium Oil Scenario .....	138
Figure 93	Asian Propane Price Scenarios .....	140
Figure 94	Propane Price Influences – Medium Oil Scenario .....	140
Figure 95	Relative Value of Propane – Medium Oil Scenario .....	140
Figure 96	Global Butane Prices – Medium Oil Scenario .....	141
Figure 97	<i>n</i> -Butane Price Scenarios .....	143
Figure 98	Butane Price Trends – Medium Oil Scenario .....	143
Figure 99	Relative Value of Butane – Medium Oil Scenario .....	143
Figure 100	Western European Butane Prices .....	145
Figure 101	Butane Price Influences – Medium Oil Scenario .....	145
Figure 102	Relative Value of Butane – Medium Oil Scenario .....	145
Figure 103	Singapore Butane Price Scenarios .....	146
Figure 104	Butane Pricing Trends – Medium Oil Scenario .....	146

## Tables

Table 1	Crude Oil Price Scenarios .....	28
---------	---------------------------------	----