

MARKETS AND PROFITABILITY

Market Analytics: Aromatics - 2020

Benzene, para-Xylene and Toluene

December 2020



This Report was prepared by Nexant Energy & Chemicals Advisory ("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 Nexant Inc. 2020. All rights reserved.



Contents

1	Executive Summary	1
1.1	Introduction	1
1.2	Aromatics Market Overview	5
1.3	Benzene.....	9
1.4	Xylenes	16
1.5	Toluene	28
2	The Aromatics Industry	30
2.1	Introduction	30
2.2	Market Summary	31
2.3	Consumption of Aromatics.....	34
2.3.1	Benzene	34
2.3.2	Toluene	35
2.3.3	<i>para</i> -Xylene	35
2.4	Market Coverage.....	35
3	Benzene.....	37
3.1	Global	37
3.1.1	Key Developments.....	37
3.1.3	Supply	45
3.1.4	Supply, Demand and Trade.....	49
3.2	North America	52
3.2.1	Key Developments.....	52
3.2.3	Supply	56
3.2.4	Supply, Demand and Trade.....	60
3.3	South America.....	63
3.3.1	Key Developments.....	63
3.3.2	Consumption.....	63
3.3.3	Supply	65
3.3.4	Supply, Demand and Trade.....	68
3.4	Western Europe	69
3.4.1	Key Developments.....	69
3.4.2	Consumption.....	69
3.4.3	Supply	72
3.4.4	Supply, Demand and Trade.....	77
3.5	Central Europe	79
3.5.1	Key Developments.....	79
3.5.2	Consumption.....	79
3.5.3	Supply	82
3.5.4	Supply, Demand and Trade.....	84
3.6	Eastern Europe	86
3.6.1	Key Developments.....	86
3.6.2	Consumption.....	86



3.6.2.1	Russia	86
3.6.2.2	Other Eastern Europe.....	89
3.6.3	Supply	90
3.6.3.1	Russia	90
3.6.3.2	Other Eastern Europe.....	93
3.6.4	Supply, Demand and Trade.....	95
3.6.4.1	Russia	95
3.6.4.2	Other Eastern Europe.....	96
3.7	Middle East	98
3.7.1	Key Developments.....	98
3.7.2	Consumption.....	98
3.7.3	Supply	102
3.7.4	Supply, Demand and Trade.....	105
3.8	Africa.....	107
3.8.1	Key Developments.....	107
3.8.2	Consumption.....	107
3.8.3	Supply	109
3.8.4	Supply, Demand and Trade.....	111
3.9	Asia Pacific.....	112
3.9.1	Key Developments.....	112
3.9.2	Consumption.....	112
3.9.2.1	China	114
3.9.2.2	North-East Asia	117
3.9.2.1	South-East Asia.....	121
3.9.2.2	South Asia.....	123
3.9.2.3	Australasia	125
3.9.3	Supply	127
3.9.3.1	China	128
3.9.3.2	North-East Asia	129
3.9.3.3	South-East Asia.....	130
3.9.3.4	South Asia.....	133
3.9.3.5	Australasia	134
3.9.4	Supply, Demand and Trade.....	143
3.9.4.1	China	144
3.9.4.2	North-East Asia	145
3.9.4.3	South-East Asia.....	145
3.9.4.1	South Asia.....	147
4	para-Xylene	150
4.1	Global	150
4.1.1	Key Developments.....	150
4.1.2	Consumption.....	150
4.1.2.1	PTA.....	151
4.1.2.2	DMT	152
4.1.2.3	Polyester	152



4.1.3	Supply	155
4.1.4	Supply, Demand and Trade.....	159
4.2	North America	163
4.2.1	Key Developments.....	163
4.2.2	Consumption.....	163
4.2.3	Supply	166
4.2.4	Supply, Demand and Trade.....	169
4.3	South America.....	172
4.3.1	Key Developments.....	172
4.3.2	Consumption.....	172
4.3.3	Supply	173
4.3.4	Supply, Demand and Trade.....	175
4.4	Western Europe	176
4.4.1	Key Developments.....	176
4.4.2	Consumption.....	176
4.4.3	Supply	178
4.4.4	Supply, Demand and Trade.....	181
4.5	Central Europe	182
4.5.1	Key Developments.....	182
4.5.2	Consumption.....	182
4.5.3	Supply	183
4.5.4	Supply, Trade and Demand.....	184
4.6	Eastern Europe	185
4.6.1	Key Developments.....	185
4.6.1.1	Russia	185
4.6.1.2	Other Eastern Europe.....	185
4.6.2	Consumption.....	185
4.6.2.1	Russia	185
4.6.2.2	Other Eastern Europe.....	186
4.6.3	Supply	187
4.6.3.1	Russia	187
4.6.3.2	Other Eastern Europe.....	188
4.6.4	Supply, Demand and Trade.....	189
4.6.4.1	Russia	189
4.6.4.2	Other Eastern Europe.....	190
4.7	Middle East	192
4.7.1	Key Developments.....	192
4.7.2	Consumption.....	192
4.7.3	Supply	194
4.7.4	Supply, Demand and Trade.....	196
4.8	Africa.....	198
4.8.1	Key Developments.....	198
4.8.2	Consumption.....	198
4.8.3	Supply	198



4.8.4	Supply, Demand and Trade.....	200
4.9	Asia Pacific.....	201
4.9.1	Key Developments.....	201
4.9.2	Consumption.....	201
4.9.2.1	China	204
4.9.2.2	North-East Asia	206
4.9.2.3	South-East Asia.....	207
4.9.2.4	South Asia.....	208
4.9.2.5	Australasia	209
4.9.3	Supply	211
4.9.3.1	China	211
4.9.3.2	North-East Asia	213
4.9.3.3	South-East Asia.....	214
4.9.3.4	South Asia.....	217
4.9.3.5	Australasia	218
4.9.4	Supply, Demand and Trade.....	223
4.9.4.1	China	225
4.9.4.2	North-East Asia	226
4.9.4.3	South-East Asia.....	227
4.9.4.4	South Asia.....	228
5	Toluene.....	231
5.1	Introduction	231
5.2	Global	232
5.3	North America	234
5.4	South America.....	235
5.5	Western Europe	237
5.6	Central Europe	239
5.7	Eastern Europe	240
5.7.1	Russia	240
5.7.2	Other Eastern Europe	240
5.8	Middle East	241
5.9	Africa.....	242
5.10	Asia Pacific.....	243

Appendices

A	Methodology	246
A.1	Market Dynamics Forecasting Methodology.....	246
A.1.1	Capacity Availability and Forecasting	246
A.1.2	End-Use Consumption Forecasting.....	246
A.1.2.1	End-Use Sector Growth.....	247
A.1.2.2	Penetration (New Application Growth)	247
A.1.2.3	Short-term Influences	248
A.1.3	Monomer Consumption Forecasting.....	248
A.1.4	Production and Trade Forecasting	249



B The Aromatics Industry	250
B.1 Technology.....	250
B.1.1 Production from Pygas.....	251
B.1.2 Production from Reformate	254
B.1.3 Production from Coal	257
B.1.4 Production from Hydro-dealkylation (HDA), Toluene Disproportionation (TDP) and Transalkylation (TA)	257
B.1.5 para-Xylene Recovery.....	261

Figures

Figure 1 Aromatics Molecules.....	30
Figure 2 Main Chemical Uses of Aromatics.....	34
Figure 3 Global Benzene Demand, 2020-e	43
Figure 4 Global GDP Growth vs. Benzene Consumption Growth	43
Figure 5 Global Benzene Consumption	44
Figure 6 Global Benzene Capacity Share by Marketer in 2020-e	47
Figure 7 Global Benzene Capacity Additions	48
Figure 8 Global Benzene Capacity	48
Figure 9 Global Benzene Supply and Demand	51
Figure 10 Regional Benzene Net Exports/Imports.....	51
Figure 11 North America Benzene Consumption, 2020-e.....	55
Figure 12 Location of Benzene Plants in North America.....	59
Figure 13 Location of Benzene Plants in the United States Gulf Coast.....	60
Figure 14 North America Benzene Supply, Demand and Trade	61
Figure 15 United States Benzene Supply, Demand and Trade.....	62
Figure 16 South America Benzene Consumption, 2020-e	64
Figure 17 Location of Benzene Plants in South America.....	67
Figure 18 South America Benzene Supply, Demand and Trade	68
Figure 19 Western Europe Benzene Consumption, 2020-e.....	71
Figure 20 Location of Benzene Plants in Western Europe.....	76
Figure 21 Western Europe Benzene Supply, Demand and Trade	78
Figure 22 Central Europe Benzene Consumption, 2020-e	81
Figure 23 Location of Benzene Plants in Central Europe	84
Figure 24 Central Europe Benzene Supply, Demand and Trade	85
Figure 25 Russia Benzene Consumption, 2020-e	88
Figure 26 Location of Benzene Plants in Russia	92
Figure 27 Location of Benzene Plants in Other Eastern Europe	94
Figure 28 Russia Benzene Supply, Demand and Trade	95
Figure 29 Other Eastern Europe Benzene Supply, Demand and Trade	96
Figure 30 Total Eastern Europe Benzene Supply, Demand and Trade.....	97
Figure 31 Middle East Benzene Consumption, 2020-e.....	101
Figure 32 Location of Benzene Plants in the Middle East.....	105
Figure 33 Middle East Benzene Supply, Demand and Trade	106
Figure 34 Location of Benzene Plants in Africa.....	110
Figure 35 Africa Benzene Supply, Demand and Trade.....	111



Figure 36	Asia Pacific Benzene Consumption, 2020-e.....	126
Figure 37	Location of Benzene Plants in China.....	141
Figure 38	Location of Benzene Plants in Japan and South Korea	142
Figure 39	Location of Benzene Plants in South-East Asia and Australia.....	142
Figure 40	Location of Benzene Plants in South Asia.....	143
Figure 41	Asia Pacific Benzene Supply, Demand and Trade.....	148
Figure 42	China Benzene Supply, Demand and Trade	149
Figure 43	Global <i>para</i> -Xylene Demand, 2020-e	153
Figure 44	Global GDP Growth vs. <i>para</i> -Xylene Consumption Growth	154
Figure 45	Global <i>para</i> -Xylene Consumption by Region	154
Figure 46	Global <i>para</i> -Xylene Capacity Share by Marketer in 2020-e	157
Figure 47	Global <i>para</i> -Xylene Capacity Additions	158
Figure 48	Global <i>para</i> -Xylene Capacity	158
Figure 49	Global <i>para</i> -Xylene Supply and Demand	161
Figure 50	Global <i>para</i> -Xylene Net Exports(Imports)	162
Figure 51	North America <i>para</i> -Xylene Consumption, 2020-e.....	165
Figure 52	Location of <i>para</i> -Xylene Plants in North America.....	168
Figure 53	North America <i>para</i> -Xylene Supply, Demand and Trade	170
Figure 54	North America <i>para</i> -Xylene Supply, Demand and Trade	170
Figure 55	United States <i>para</i> -Xylene Supply, Demand and Trade.....	171
Figure 56	Location of <i>para</i> -Xylene Plants in South America.....	174
Figure 57	South America <i>para</i> -Xylene Supply, Demand and Trade	175
Figure 58	Western Europe <i>para</i> -Xylene Consumption, 2020-e.....	177
Figure 59	Location of <i>para</i> -Xylene Plants in Western Europe.....	180
Figure 60	Western Europe <i>para</i> -Xylene Supply, Demand and Trade	181
Figure 61	Location of Central Europe <i>para</i> -Xylene Plants	183
Figure 62	Central Europe <i>para</i> -Xylene Supply, Demand and Trade	184
Figure 63	Russia <i>para</i> -Xylene Consumption, 2020-e	186
Figure 64	Location of <i>para</i> -Xylene Plants in Russia	187
Figure 65	Location of Eastern Europe <i>para</i> -Xylene Plants	188
Figure 66	Russia <i>para</i> -Xylene Supply, Demand and Trade	189
Figure 67	Other Eastern Europe <i>para</i> -Xylene Supply, Demand and Trade.....	190
Figure 68	Total Eastern Europe <i>para</i> -Xylene Supply, Demand and Trade.....	191
Figure 69	Middle East <i>para</i> -Xylene Consumption, 2020-e.....	193
Figure 70	Location of <i>para</i> -Xylene in the Middle East	196
Figure 71	Middle East <i>para</i> -Xylene Supply, Demand and Trade][.....	197
Figure 72	Location of <i>para</i> -Xylene in and Africa.....	199
Figure 73	Africa <i>para</i> -Xylene Supply, Demand and Trade.....	200
Figure 74	Asia Pacific <i>para</i> -Xylene Consumption, 2020-e.....	210
Figure 75	Location of <i>para</i> -Xylene Plants in China.....	221
Figure 76	Location of <i>para</i> -Xylene Plants in Japan and South Korea	222
Figure 77	Location of <i>para</i> -Xylene Plants in India	223
Figure 78	Asia Pacific <i>para</i> -Xylene Supply, Demand and Trade.....	229
Figure 79	China <i>para</i> -Xylene Supply, Demand and Trade	230



Figure 80	Global Toluene Net Exports(Imports)	233
Figure 81	North America Toluene Net Trade.....	235
Figure 82	South America Toluene Net Trade.....	236
Figure 83	Western Europe Toluene Net Trade.....	238
Figure 84	Central Europe Toluene Net Trade	239
Figure 85	Russia Toluene Net Trade	240
Figure 86	Other Eastern Europe Toluene Net Trade.....	240
Figure 87	Middle East Toluene Net Trade.....	241
Figure 88	Africa Tolune Net Trade.....	242
Figure 89	Asia Pacific Toluene Net Trade.....	244
Figure 90	End-Use Consumption Drivers.....	247
Figure 91	Monomer Consumption Drivers	248
Figure 92	Trade Considerations	249
Figure 93	Global Benzene Capacity by Process, 2019.....	251
Figure 94	Effect of Feedstock Onsteam Cracker Aromatics Yields	252
Figure 95	Effect of Severity Onsteam Cracker Aromatics Yields	252
Figure 96	BTX Recovery From Pygas Block Flow Diagram.....	253
Figure 97	Simplified Block Flow Diagram for a Simple Aromatics Plant	255
Figure 98	Continuous Catalytic Reforming Process Flow Diagram	256
Figure 99	Toluene Hydrodealkylation Process Flow Diagram.....	258
Figure 100	Toluene Disproportionation Process Flow Diagram	259
Figure 101	Transalkylation Process Flow Diagram	260
Figure 102	Xylenes Recovery Block Flow Diagram.....	262

Tables

Table 1	Global Benzene Consumption by Derivative	43
Table 2	Global Benzene Consumption by Region	44
Table 3	Global Benzene Supply and Demand	51
Table 4	North America Benzene Consumption by Derivative	55
Table 5	North America Benzene Consumption by Country.....	55
Table 6	Benzene Capacity in North America.....	57
Table 7	North America Benzene Supply, Demand and Trade	61
Table 8	United States Benzene Supply, Demand and Trade.....	62
Table 9	South America Benzene Consumption by Derivative.....	64
Table 10	South America Benzene Consumption by Country	64
Table 11	Benzene Capacity in South America.....	66
Table 12	South America Benzene Supply, Demand and Trade.....	68
Table 13	Western Europe Benzene Consumption by Derivative	71
Table 14	Benzene Capacity in Western Europe.....	74
Table 15	Western Europe Benzene Supply, Demand and Trade	78
Table 16	Central Europe Benzene Consumption by Derivative	81
Table 17	Benzene Capacity in Central Europe	83
Table 18	Central Europe Benzene Supply, Demand and Trade	85
Table 19	Russia Benzene Consumption by Derivative.....	88



Table 20	Other Eastern Europe Benzene Consumption by Derivative.....	89
Table 21	Benzene Capacity in Russia	91
Table 22	Benzene Capacity in Eastern Europe.....	94
Table 23	Russia Benzene Supply, Demand and Trade	95
Table 24	Other Eastern Europe Benzene Supply, Demand and Trade	96
Table 25	Total Eastern Europe Benzene Supply, Demand and Trade.....	97
Table 26	Middle East Benzene Consumption by Derivative	101
Table 27	Middle East Benzene Consumption by Country.....	101
Table 28	Benzene Capacity in the Middle East.....	104
Table 29	Middle East Benzene Supply, Demand and Trade	106
Table 30	Africa Benzene Consumption by Derivative.....	108
Table 31	Africa Benzene Consumption by Country	108
Table 32	Benzene Capacity in Africa.....	109
Table 33	Africa Benzene Supply, Demand and Trade.....	111
Table 34	Asia Pacific Benzene Consumption by Derivative.....	126
Table 35	Asia Pacific Benzene Consumption by Country.....	126
Table 36	Benzene Capacity in Asia Pacific.....	134
Table 37	Asia Pacific Benzene Supply, Demand and Trade.....	148
Table 38	China Benzene Supply, Demand and Trade	149
Table 39	Global para-Xylene Consumption by End-Use	153
Table 40	Global para-Xylene Consumption by Region	154
Table 41	Global para-Xylene Supply and Demand	161
Table 42	North America para-Xylene Consumption by End-Use	165
Table 43	North America para-Xylene Consumption by Country.....	165
Table 44	para-Xylene Capacity in North America.....	167
Table 45	United States para-Xylene Supply, Demand and Trade.....	171
Table 46	South America para-Xylene Consumption by End-Use.....	172
Table 47	South American para-Xylene Consumption by Country	172
Table 48	para-Xylene Capacity in South America	173
Table 49	South America para-Xylene Supply, Demand and Trade	175
Table 50	Western Europe para-Xylene Consumption by End-Use	177
Table 51	para-Xylene Capacity in Western Europe.....	179
Table 52	Western Europe para-Xylene Supply, Demand and Trade	181
Table 53	Central Europe para-Xylene Consumption by End-Use	182
Table 54	para-Xylene Capacity in Central Europe	183
Table 55	Central Europe para-Xylene Supply, Demand and Trade	184
Table 56	Russia para-Xylene Consumption by End-Use.....	186
Table 57	Other Eastern Europe para-Xylene Consumption by End-Use.....	186
Table 58	para-Xylene Capacity in Russia	187
Table 59	para-Xylene Capacity in Eastern Europe.....	188
Table 60	Russia para-Xylene Supply, Demand and Trade.....	189
Table 61	Other Eastern Europe para-Xylene Supply, Demand and Trade.....	190
Table 62	Total Eastern Europe para-Xylene Supply, Demand and Trade.....	191
Table 63	Middle East para-Xylene Consumption by End-Use	193



Table 64	Middle East <i>para</i> -Xylene Consumption by Country.....	193
Table 65	<i>para</i> -Xylene Capacity in the Middle East.....	195
Table 66	Middle East <i>para</i> -Xylene Supply, Demand and Trade	197
Table 67	<i>para</i> -Xylene Capacity in Africa.....	198
Table 68	Africa <i>para</i> -Xylene Supply, Demand and Trade.....	200
Table 69	Asia Pacific <i>para</i> -Xylene Consumption by End-Use	210
Table 70	Asia Pacific <i>para</i> -Xylene Consumption by Country.....	210
Table 71	<i>para</i> -Xylene Capacity in Asia Pacific.....	219
Table 72	Location of <i>para</i> -Xylene Plants in South-East Asia.....	222
Table 73	Asia Pacific <i>para</i> -Xylene Supply, Demand and Trade.....	229
Table 74	China <i>para</i> -Xylene Supply, Demand and Trade	230