

TABLE OF CONTENTS

Introduction	1
ACC Economics and Statistics Department Staff	1
1 CHEMISTRY AND THE ECONOMY	3
Chemistry in Our Lives.....	4
Economic Contributions of the Business of Chemistry	6
2 WHAT IS THE BUSINESS OF CHEMISTRY?	11
Cost Structure.....	12
Production Indices	13
Price Indices.....	13
Shipment Value	14
Financial Performance.....	15
3 CHEMISTRY 101.....	17
Basic Chemicals.....	17
Specialty Chemicals	21
Agricultural Chemicals.....	26
Consumer Products	26
4 U.S. TRADE IN THE BUSINESS OF CHEMISTRY	31
Trade by Country/Region.....	32
Trade by Segment	34
5 GLOBAL BUSINESS OF CHEMISTRY	37
World Trade.....	37
Global CPRI.....	40
6 INNOVATION	41
Research and Development Activities	41
7 INVESTMENT IN THE FUTURE: CAPITAL	45
Capital Investment.....	45
Profits and Other Determinants of Investment	46
Motivation for Capital Investment	47
Foreign Direct Investment	47
Maintenance and Repair Spending	48
Information Technology.....	48
8 EMPLOYMENT.....	49
Total Employment Impact of the Business of Chemistry	49
Knowledge Workers.....	50
Wages, Benefits and Other Labor Indicators.....	51

9 ENVIRONMENT, HEALTH AND SAFETY.....	53
Environmental Performance	54
Environmental, Health and Safety Spending	54
Worker Health and Safety	58
Spending on Security.....	59
ACC’s Commitment to EHS&S.....	60
10 ENERGY	63
Fuel and Power	63
Feedstocks.....	63
Natural Gas & Petroleum Products.....	65
Energy Consumption	66
Energy Costs.....	68
Chemical Industry Energy Efficiency.....	68
Energy Efficiency from the Products of Chemistry	69
Greenhouse Gas Emissions	70
11 DISTRIBUTION.....	73
Transportation by Mode.....	74
12 CHEMISTRY IN THE STATES AND REGIONS	75
Employment Impact of the Business of Chemistry	77
U.S. Chemical Production Regional Index.....	80
APPENDIX A: CHEMICAL CHAINS	81
A.1 - Chlor-Alkali	81
A.2 - Methanol	82
A.3 - Ammonia	83
A.4 - Ethylene.....	84
A.5 - Propylene	85
A.6 - C4 Hydrocarbons	86
A.7 - Benzene	87
A.8 - Toluene	88
A.9 - Xylene	89
APPENDIX B: GLOSSARY	91

LIST OF TABLES

Table 1.1 - U.S. Business of Chemistry Industry Snapshot, 2018.....	7
Table 1.2 - Industries Dependent upon the U.S. Business of Chemistry, 2018.....	8
Table 2.1 - Business of Chemistry Summary, 2014-2018	11
Table 2.2 - Characteristics of the Business of Chemistry	12
Table 2.3 - Industrial Production Indices, 2014-2018.....	13
Table 2.4 - Producer Price Indices, 2014-2018	13
Table 2.5 - Business of Chemistry Shipments by Segment, 2014-2018.....	14
Table 2.6 - Chemicals: Select Measures of Financial Performance, 2018	15
Table 3.1 - Plastic Resins Summary, 2014-2018.....	20
Table 4.1 - 2018 Top Chemicals Trade Partners	32
Table 4.2 - Top Chemicals Export Destinations, 2014-2018.....	32
Table 4.3 - Top Chemicals Import Countries of Origin, 2014-2018	33
Table 4.4 - Chemical Exports by Segment, 2014-2018	34
Table 4.5 - Chemical Imports by Segment, 2014-2018	34
Table 5.1 - Global Chemical Shipments by Region, 2014-2018.....	38
Table 8.1 - Employment in the Business of Chemistry, 2014-2018	49
Table 8.2 - Total Jobs Supported by the Business of Chemistry, 2018	50
Table 8.3 - Occupation/Segment Mix in the Business of Chemistry, 2018.....	51
Table 9.1 - Key Pollution Indicators: A Summary of Progress	55
Table 9.2 - Toxics Release Inventory: Business of Chemistry.....	57
Table 9.3 - Occupational Injury and Illness Rates.....	58
Table 10.1 - Energy Consumption by the Business of Chemistry	66
Table 10.2 - Business of Chemistry Greenhouse Gas Emissions	71
Table 12.1 - State Chemistry Statistics, 2018	76
Table 12.2 - Jobs and Payroll Generated by the Business of Chemistry by State, 2018.....	78
Table 12.3 - U.S. Chemical Production Regional Index, 2014-2018.....	80

LIST OF FIGURES

Figure 1.1 - U.S. Business of Chemistry Flow Chart, 2018.....	6
Figure 2.1 - Business of Chemistry Shipments by Segment, 2018	14
Figure 3.1 - Basic Chemicals Shipments, 2018	18
Figure 3.2 - Business of Chemistry Chemical Chain.....	29
Figure 4.1 - U.S. Trade in the Business of Chemistry.....	31
Figure 4.2 - Total U.S. Chemicals Exports by Region	32
Figure 4.3 - Total U.S. Chemicals Imports by Region	33
Figure 4.4 - Chemicals Trade Balance by Segment	35
Figure 5.1 - Global Chemical Exports and Imports by Region, 2018	38
Figure 5.2 - Global Chemical Domestic Sales by Region, 2018.....	39
Figure 5.3 - Global Chemical Shipments by Segment	39
Figure 5.4 - Global Chemical Production Regional Index	40
Figure 6.1 - Basic and Specialty Chemical Companies' R&D Spending by Type, 2018	42
Figure 6.2 - R&D Spending in the Business of Chemistry	42
Figure 6.3 - Share of Revenues from New Products	44
Figure 7.1 - Capital Investment - Chemicals.....	45
Figure 7.2 - Capacity Utilization	46
Figure 7.3 - Foreign Direct Investment	47
Figure 8.1 - Labor Productivity	52
Figure 8.2 - Total Employee Compensation	52
Figure 9.1 - EH&S Spending by Basic and Specialty Chemical Producers.....	54
Figure 9.2 - EH&S Spending by Type of Spending	54
Figure 9.3 - Environmental Progress and Economic and Population Growth in the U.S.....	56
Figure 9.4 - Environmental Progress and Production in the Business of Chemistry.....	56
Figure 9.5 - TRI Releases by Media: Business of Chemistry.....	57
Figure 9.6 - Trends in Occupational Injury and Illness Incidence Rates	58
Figure 9.7 - Security Spending by ACC Member Companies	59
Figure 10.1 - Derivation of Petrochemical Feedstocks	64
Figure 10.2 - U.S. Based Petrochemical Competitiveness: Ratio of the Price of Oil (Brent) to Natural Gas (Henry Hub).....	65
Figure 10.3 - Composition of Energy Requirements, 2018.....	66
Figure 10.4 - Share of Total Energy Consumption by Segment.....	67
Figure 10.5 - Share of Total Energy Consumption by Source	67
Figure 10.6 - Value of Energy Consumed by the Business of Chemistry	68
Figure 11.1 - Business of Chemistry: Transportation by Mode, 2018.....	73
Figure 12.1- Chemistry Shipments by State, 2018	75
Figure 12.2 - Number of Business of Chemistry Establishments by State	80