

**GLOBAL HDPE/MDPE  
MARKETS, TECHNOLOGIES & TRENDS  
2010-2015-2020 - A Multi-Client Study**

**PROSPECTUS for  
An In-depth Strategic Analysis**

**What are the features of HDPE/MDPE have led to the broader applications and larger market demand than LLDPE as well as LDPE? HDPE and MDPE, how are they defined? The historical background for the HDPE development for which the 1963 Nobel Prize in chemistry was awarded? The features of HDPE/MDPE catalyst technology? The technical requirements for each of the six major applications? The pivotal role of bimodality process technology in HDPE/MDPE product development? Where are HDPE/MDPE headed for?**



**What are the status and trends of HDPE/MDPE markets? What are the demand and supply status of HDPE/MDPE? How is the growth driver tree methodology used to analyze the demand? The SWOT analysis for each of the 10 regions worldwide? The global demand forecast for 2010-2015-2020? The supply/demand balance and operating rate from 1995 to 2015? The N. American shale gas development impacts the PE industry worldwide?**



**HDPE/MDPE Challenges and Opportunities**

**What are the strategies for HDPE film resin producers facing the taxation of plastic bags by legislation? The advantages of HDPE over PP in the inter-material competition? Where are the future investment opportunities? What are the criteria for process technology selection? The competitive landscape for the global top 12 HDPE producers? How does each licensor fare in the assessment of market potential vs. technology position? What is the potential of metallocene technology in HDPE?**



**Chemical Market Resources, Inc.**

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# **GLOBAL HDPE/MDPE**

## **Markets, Technologies & Trends**

### **2010-2015-2020**

#### **INTRODUCTION**

Polyethylene (PE) is a semi-crystalline polymer and the largest volume plastics in the world. It has wide range of applications including packaging molded goods, and extruded products etc. Basically, PE can be classified in three categories: LDPE, LLDPE, and HDPE/MDPE, of which the HDPE/MDPE has the largest market share (42.5%). Owing to the significance of the development of linear polyethylene under low pressure, K. Ziegler shared the 1963 Noble Prize in chemistry with G. Natta.

#### **A NEW MULTI-CLIENT STUDY**

Chemical Market Resources, Inc., with our extensive experience in (1) worldwide olefin and polyolefin markets analysis and trends, (2) catalyst, process technologies, and products, and (3) inter-material competitions, is undertaking a comprehensive global strategic analysis on this fast-changing arena. Our in-depth analysis and methodology are designed to aid companies in capitalizing on the market and technology opportunities.

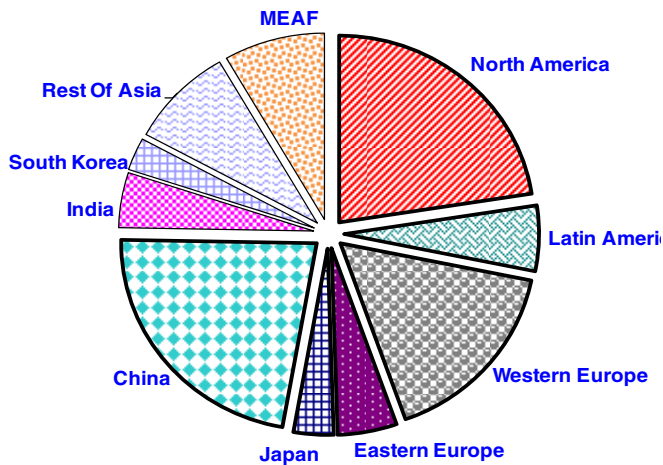
The report will benefit: (1) HDPE/MDPE polyolefins producers, (2) Converters and fabricators in BM, HMW film, IM, Pipe, rotomolding, and sheet areas, (3) Catalyst (Cr and Ti) suppliers for HDPE/MDPE, (4) Marketing managers and strategists, (5) technology developers / licensors, (6) investment banks & equity research analysts.

#### **OBJECTIVES**

- Define the HDPE/MDPE by density and rationalize why HDPE/MDPE has such a wide range of applications and constitutes much larger market share compared with LLDPE and LDPE
- Provide the chronology of how the linear HDPE was discovered by Hogan and Banks with chromium oxide catalyst and by K. Ziegler with titanium catalyst, both under significantly lower low pressure than that for LDPE
- Provide the analysis of the market status and trends in supply and demand of HDPE/MDPE for the 10 regions in the world
- Provide the analysis of the global market trends
- Provide the status of competitive landscape of catalyst and process technologies to assist potential licensees in selection and also aid the licensors in assessing their own positions
- Provide the analysis of the role of “bimodality” in HDPE/MDPE
- Provide a competitive analysis and benchmarking of top 12 HDPE Producers
- Provide the prospect and challenges for the shale gas success which has triggered heavy investment in crackers in N. America and also has galvanized petrochemical industry in Europe and China



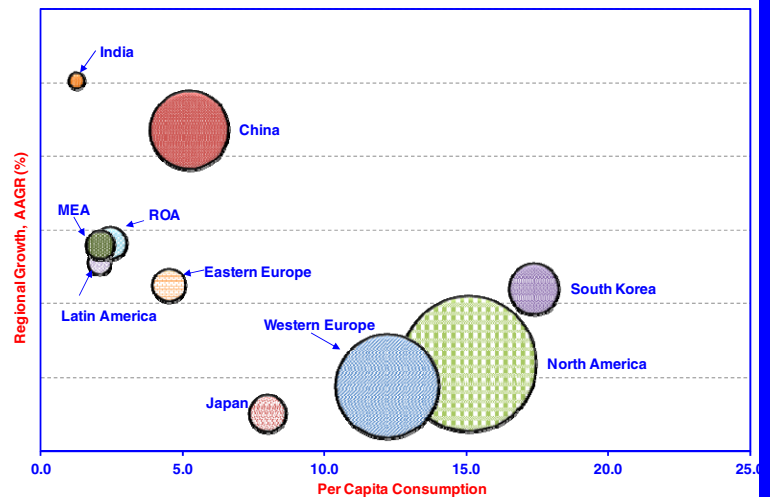
## Global Demand for HDPE by Region, 2010



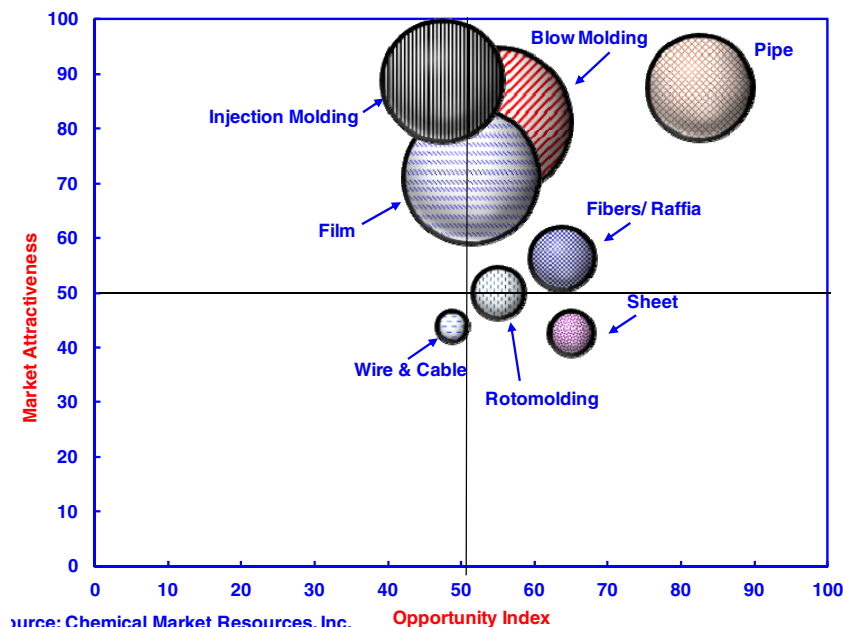
In the left exhibit, major HDPE consuming regions are N. America, China, and W. Europe. However China's demand growth rate far exceeds N. America, W. Europe and rest of the world. China is expected to continue being the global demand center for HDPE.

In the right exhibit, India and China are not high on HDPE per capita consumption (associated with advanced living standard) but the situation will change in the next 5 years. On the other hand, India and China lead the pack in annual growth rate due to high GDP growth as well as the mass (the two most populous nations in the world).

## Regional Growth & Per Capita Consumption of HDPE, 2010



## Market Attractiveness versus Opportunity Index



In the left exhibit, the top two major market opportunities for HDPE are pressure pipes and blow molding applications. In HDPE, the PE-100 (or PE4710) pressure pipe resin has become synonymous with the most coveted product of value-addition.

Source: Chemical Market Resources, Inc.

Opportunity Index



Chemical Market Resources, Inc.

## KEY ISSUES ADDRESSED

- *The impact resulting from the two breakthroughs some 20 years after the discovery of LDPE at ICI – Cr catalyst by Hogan and Banks (in 1951) of Phillips Petroleum and Ti catalyst by K. Ziegler et al. (in 1953) in Germany.*
- *The definition of HDPE and MDPE and how the higher density PE led to the much broader range of applications (BM, Film, IM, Pipe, Rotomolding, and Sheet) vs. LLDPE and LDPE where the film is the predominant application*
- *The development of bimodal or multi-modal HDPE (by cascade reactors or dual site catalyst in a single reactor) has enabled Ziegler resins to compete with Cr based resins. They have gained greater popularity specifically in pressure pipe and HMW HDPE film applications*
- *The analysis of the trends of world and regional supply and demand of HDPE from 2010 to 2015 to 2020, with China clearly the global demand center*
- *The inter-material competition with PP and how to capitalize on it*
- *The potential of metallocene technology in HDPE – a rationalization*
- *The environmental challenge and suggested measures for PE resin producers and PE bag fabricators in face of the taxation of HMW HDPE film and bags*

## APPROACH

The information, data, and conclusions of this analysis developed from sources in Americas, Europe, Japan, China, Asia, Middle East, and Rest of the World are based upon, but not limited to, the following methods:

- *Interviews with leading polyolefins and catalyst suppliers and end users*
- *Search, review, and interpretation of information from individual organizations, government sources, trade and industry groups, government agencies, published articles, and product promotional information*
- *Public-domain information from the dozens of projects Chemical Market Resources, Inc. has undertaken over the past 5 years*
- *Information from our extensive, on-going coverage of the industry found in our publication, NEW GENERATION POLYOLEFINS – A Global Bimonthly Review (Call for a complimentary copy!)*
- *Thorough analysis by our highly talented group of engineers, scientists, and MBAs – our work is unparalleled in quality and depth*

**The complete Table of Contents and List of Exhibits are attached at the end of this Prospectus**



# GLOBAL HDPE/MDPE MARKETS, TECHNOLOGIES, AND TRENDS 2010-2015-2020

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## **ABOUT OUR COMPANY...**

**CHEMICAL MARKET RESOURCES, Inc., was founded in 1990 to focus on areas of marketing research and strategic planning. Our global clientele is concentrated within the chemical, petrochemical, plastics and related industries.**

Our team of professionals has a strong technical background combined with hands-on business experience. Compilation of data, strategic analyses, writing, and editing are entirely conducted in our state of the art facilities in-house, to assure quality control at each stage of development. Our strength is in providing our clients close interaction to maximize effectiveness. We provide in-depth analyses with actionable statements in a cost-effective and timely fashion.

### **Our Recently Completed Multi-Client Studies:**

1. Global LDPE/EVA & High EVA Analysis 2009-2014-2030
2. Global HDPE & MDPE Analysis 2010-2015-2020
3. Worldwide Styrene Block Copolymers 2010-2015
4. Global Tie Layer Resins 2010-2015
5. Global Specialty Polyolefins 2008-2013
6. Global Polyolefin Catalysts 2008-2012 (An update to be released in 1Q 2012)
7. Global Metallocenes 2006-2011
8. Global Polyolefins Competitive Assessment
9. APP/APAO and SB Copolymers vs. New Generation Polyolefins, Markets, Technologies and Intermaterial Competition Trends
10. New Generation Polyolefins - A Bimonthly Global Review of Markets, Technologies & Trends – Now in its 16<sup>th</sup> year of publication (over 60 issues)
11. Intermaterial Competition of Flexible PVC, TPEs and EP(D)M Rubbers vs. new Generation Polyolefins - North America, Europe and Japan - Markets, Technologies and Trends
12. Chemical Market Resources, Inc., Polyolefins MT&T™ Series - An in-depth benchmark analysis of significant markets and technologies that will impact the global polyolefin industry over the next decade on: (1) PP Films, (2) High EVAs, (3) Polyolefin Foams, (4) Polyurethanes, (5) Metallocenes, (6) Elastomeric Polyolefins – TPOs, Plastomers and Elastomers, (7) PP Fibers, (8) Acid Copolymers and Ionomers, (9) EP(D)M and EPM, (10) Tie Layer Resins

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# TABLE OF CONTENTS

## CHAPTER 1: EXECUTIVE SUMMARY

1.1 HISTORY AND BACKGROUND .....	1-1
1.2 CLASSIFICATIONS AND DEFINITION .....	1-2
1.3 OBJECTIVES .....	1-2
1.4 REGIONS COVERED IN THIS STUDY .....	1-2
1.5 HDPE CATALYST .....	1-3
1.5.1 Chromium Catalysts .....	1-3
1.5.2 Industry Structure of Chromium Catalysts.....	1-5
1.5.3 Ziegler Natta PE Catalysts.....	1-5
1.5.4 Industry Structure of Ziegler Natta PE Catalysts .....	1-5
1.6 HDPE PRODUCTION TECHNOLOGY .....	1-7
1.7 APPLICATIONS .....	1-11
1.7.1 Blow Molding .....	1-11
1.7.2 HMW Film .....	1-13
1.7.3 Injection Molding .....	1-16
1.7.4 Pipe and Conduit Applications.....	1-19
1.7.5 Rotational Molding.....	1-22
1.7.6 Sheet.....	1-25
1.8 GLOBAL SUPPLY ANALYSIS .....	1-30
1.8.1 Global Capacity by Region, 2010 .....	1-30
1.8.2 Global Capacity by Process Type, 2010 .....	1-30
1.8.3 Global Capacity by Modality, 2010 .....	1-33
1.8.4 Global Capacity by Licensing Technology and Licensor.....	1-33
1.8.5 Market attractiveness vs. Technology position, Licensors .....	1-38
1.8.6 Global Capacity by Producer, 2010.....	1-38
1.8.7 Global Capacity Expansions, by Region, 2010-2015-2020.....	1-38
1.9 GLOBAL DEMAND ANALYSIS, 2010.....	1-45
1.9.1 Global Historical Demand.....	1-45
1.9.2 Global Demand by Region, 2010 .....	1-45
1.9.3 Global Demand by Modality.....	1-45
1.9.4 Global Demand by Applications .....	1-49
1.9.4.1 Global HDPE Demand in Major Applications, by Resin Type .....	1-49
1.9.5 HDPE per capita Consumption.....	1-53
1.9.6 Market Attractiveness vs. Opportunity .....	1-53
1.9.7 Demand by Region and Growth, 2010 .....	1-53
1.9.8 Global Demand for Bimodal HDPE by Region, 2010 .....	1-57
1.9.9 Global Demand for MDPE by Application, 2010 .....	1-57
1.9.10 Global Demand for MDPE by Region, 2010.....	1-60
1.9.11 Global Demand for MDPE by Application.....	1-60
1.9.12 Global Demand Growth 2010-2015-2020 .....	1-60



## TABLE OF CONTENTS (CONT'D)

1.9B GLOBAL OPERATING BALANCES 2010-2015 .....	1-63
1.9C INTERMATERIAL COMPETITION .....	1-63
<b>CHAPTER 2 INTRODUCTION</b>	
2.1 HISTORY AND BACKGROUND .....	2-1
2.2 CLASSIFICATIONS AND DEFINITIONS .....	2-3
2.3 OBJECTIVES .....	2-3
2.4 CMR METHODOLOGY .....	2-3
2.5 REGIONS COVERED IN THIS STUDY .....	2-4
2.6 LIST OF ABBREVIATIONS .....	2-6
<b>CHAPTER 3 STRATEGIC ANALYSIS</b>	
3.1 INTRODUCTION .....	3-1
3.2 ENVIRONMENTAL ISSUES .....	3-1
3.2.1 Strategic Implications.....	3-2
3.3 INTERMATERIAL COMPETITION.....	3-2
3.3.1 Strategic Implications.....	3-3
3.4 PRODUCT DIFFERENTIATION.....	3-4
3.4.1 Strategic Implications.....	3-4
3.5 INVESTMENT OPPORTUNITIES.....	3-4
3.5.1 Strategic Implications.....	3-5
3.6 TECHNOLOGY SELECTION.....	3-8
3.6.1 Global Capacity by Modality .....	3-8
3.6.2 Global Capacity by Licensing Technology and Licensor.....	3-11
3.6.3 Market attractiveness vs. Technology Position, Licensors.....	3-11
3.6.4 Trends in Technology .....	3-11
3.7 COMPETITIVE ANALYSIS AND BENCHMARKING .....	3-17
3.7.1 Analysis of Top Twelve HDPE Producers .....	3-17
3.7.2 Global Production Footprint.....	3-31
3.7.3 Feedstock Integration .....	3-31
3.7.4 Supplier Product Focus .....	3-31
3.8 METALLOCENE IN HDPE .....	3-36
3.8.1 History.....	3-36
3.8.2 Metallocene HDPE .....	3-37
3.9 GLOBAL DEMAND TRENDS.....	3-39
3.9.1 HDPE per capita Consumption.....	3-39
3.9.2 Market Attractiveness vs. Opportunity.....	3-41
3.9.3 Demand by Region and Growth .....	3-41
<b>CHAPTER 4 APPLICATION PROFILES</b>	
4.1 INTRODUCTION .....	4-1
4.2 BLOW MOLDING .....	4-1
4.2.1 Introduction .....	4-1
4.2.2 Technical Requirements .....	4-3



## TABLE OF CONTENTS (CONT'D)

4.2.3 Major Applications .....	4-4
4.2.4 Application Tree-Blow Molding End-Use Applications .....	4-5
4.2.5 Analysis of Sample Blow molding Grades by Major Producers .....	4-5
4.2.6 Multi-attribute Analysis.....	4-7
4.3 HMW HDPE FILMS .....	4-10
4.3.1 Introduction .....	4-10
4.3.2 Technical Requirements .....	4-10
4.3.3 Major Applications .....	4-10
4.3.4 Analysis of Sample HMW HDPE Film Grades by Major Producers .....	4-11
4.3.5 Multi-attribute Analysis.....	4-11
4.4 INJECTION MOLDING .....	4-14
4.4.1 Introduction .....	4-14
4.4.2 Technical Requirements .....	4-14
4.4.3 Major Applications .....	4-14
4.4.4 Applications Tree of Injection Molding Applications .....	4-16
4.4.5 Analysis of Sample Injection Molding Grades by Major Producers .....	4-16
4.4.6 Multi-attribute Analysis.....	4-19
4.5 HDPE/MDPE PIPE AND CONDUIT APPLICATIONS.....	4-19
4.5.1 Introduction .....	4-19
4.5.2 Technical Requirements .....	4-21
4.5.3 Major Applications .....	4-22
4.5.3.1 Solid- Wall Pipes.....	4-22
4.5.3.2 Corrugated Pipes .....	4-24
4.5.4 Pipe Resin Technical Requirements/Markets Requirements .....	4-26
4.5.5 Bimodal Pipe resin attributes .....	4-29
4.5.6 MDPE.....	4-30
4.5.7 High Pressure Pipe PE-100 and PE 4710.....	4-30
4.5.7.1 PE-100 Certified by ISO .....	4-30
4.5.7.2 ASTM System-PE4710.....	4-31
4.5.7.3 Definition of PE4710 based on ASTM.....	4-31
4.5.8 Multi-attribute analysis .....	4-38
4.6 ROTATIONAL MOLDING .....	4-40
4.6.1 Introduction .....	4-40
4.6.2 Technical Requirements .....	4-40
4.6.3 Major Applications. ....	4-41
4.6.4 Growth Driver Tree of Rotational Molding Applications.....	4-41
4.6.5 Analysis of Sample Rotational Molding Grades By Major Producers .....	4-41
4.6.6 Multi-attribute analysis.....	4-41
4.7 SHEET .....	4-44
4.7.1 Introduction .....	4-44
4.7.2 Technical Requirements .....	4-44



## TABLE OF CONTENTS (CONT'D)

4.7.3 Major Applications .....	4-44
4.7.4 Application Tree-Sheet End-Uses .....	4-47
4.7.5 Analysis of Sample Sheet Grades by Major Producers .....	4-47
4.7.6 Multi-attribute analysis .....	4-47
<b>CHAPTER 5 GLOBAL SUPPLIES, DEMAND, &amp; TRADE ANALYSIS</b>	
5.1 INTRODUCTION .....	5-1
5.2 SUPPLY SUMMARY .....	5-1
5.2.1 Global HDPE Supply, by Region, 2010 .....	5-1
5.2.2 Global HDPE Supply, by Modality, 2010 .....	5-2
5.2.3 Global HDPE Supply, by Process type, 2010.....	5-2
5.2.4 Global HDPE Supply, by Technology, 2010.....	5-5
5.2.5 Global HDPE Supply, by Licensor, 2010.....	5-5
5.2.6 Global HDPE Supply, by Producers, 2010 .....	5-9
5.3 DEMAND SUMMARY.....	5-9
5.3.1 Global HDPE Demand, by Applications, 2010 .....	5-9
5.3.2 Global HDPE Demand, by Region, 2010. ....	5-9
5.3.3 Global HDPE Demand, by Modality, 2010 .....	5-14
5.3.4 Global Bimodal HDPE Demand, by Application, 2010.....	5-14
5.3.5 Global Bimodal HDPE Demand, by Region, 2010 .....	5-14
5.3.6 Global MDPE Demand, by Application, 2010.....	5-18
5.3.7 Global MDPE Demand, by Region, 2010 .....	5-18
5.4 TRADE FLOW PATTERN, 2010 .....	5-21
5.5 DEMAND FORECAST .....	5-21
5.5.1 HDPE Demand Forecast, by Modality, 2015-2020. ....	5-21
5.5.2 HDPE Growth Driver Tree Analysis, by Application, .....	5-25
2010-2015- 2020 .....	5-25
5.5.3 HDPE Demand Forecast, by Region, 2010-2015-2020. ....	5-27
5.6 SUPPLY FORECAST.....	5-29
5.6.1 HDPE Supply Forecast, by Region, 2010-2015 .....	5-29
<b>CHAPTER 6A NORTH AMERICA HDPE MARKET ANALYSIS</b>	
6A.1 INTRODUCTION.....	6A-1
6A.1.1 Supply.....	6A-1
6A.1.2 Demand .....	6A-4
6A.1.3 Trade .....	6A-4
6A.1.4 Operating Balance.....	6A-8
6A.2 UNITED STATES & CANADA HDPE MARKET ANALYSIS .....	6A-12
6A.2.1 INTRODUCTION.....	6A-12
6A.2.1.1 Economic Indicators.....	6A-12
6A.2.2 DEMAND ANALYSIS .....	6A-12
6A.2.2.1 introduction .....	6A-12
6A.2.2.2 Historical Demand .....	6A-14



## TABLE OF CONTENTS (CONT'D)

6A.2.2.3	Developments/Trends influencing growth .....	6A-17
6A.2.2.4	Demand for HDPE, U.S. and Canada 2010.....	6A-17
6A.2.2.5	Demand for HDPE by Type, 2010.....	6A-19
6A.2.2.6	Demand for HDPE by Application, 2010.....	6A-19
6A.2.2.6.1	Blow Molding (BM).....	6A-19
6A.2.2.6.2	Injection Molding (IM) .....	6A-24
6A.2.2.6.3	Film.....	6A-26
6A.2.2.6.4	Pipe .....	6A-27
6A.2.2.6.5	Sheet.....	6A-31
6A.2.2.6.6	Wire and Cable .....	6A-33
6A.2.2.6.7	Rotomolding .....	6A-33
6A.2.2.7	Summary of Demand for Bimodal HDPE by Application, 2010.....	6A-36
6A.2.2.8	Summary of Demand for MDPE by Application, 2010.....	6A-36
6A.2.3	Demand Forecast US & Canada .....	6A-39
6A.2.3.1	Economic Indicators.....	6A-39
6A.2.3.2	HDPE Short-term Demand Forecast.....	6A-39
6A.2.3.3	HDPE Growth Driver Tree Analysis .....	6A-42
6A.2.3.3.1	Pipe .....	6A-42
6A.2.3.3.2	Blow molding .....	6A-44
6A.2.3.3.3	Injection Molding.....	6A-44
6A.2.3.3.4	Film. ....	6A-45
6A.2.3.3.5	Other Markets .....	6A-46
6A.2.3.3.6	Growth Driver Tree for Bimodal HDPE.....	6A-46
6A.2.3.3.7	Growth Driver Tree for MDPE.....	6A-46
6A.2.4	Supply Analysis US & Canada.....	6A-48
6A.2.4.1	Introduction.....	6A-48
6A.2.4.2	Historical Supply for HDPE, 2000-2010.....	6A-48
6A.2.4.3	Regional Supply for HDPE, 2010 .....	6A-50
6A.2.4.4	Supply for the HDPE by Process Type, 2010.....	6A-50
6A.2.4.5	Supply for HDPE by Producer, 2010 .....	6A-50
6A.2.4.6	Supply for HDPE by Technology, 2010 .....	6A-56
6A.2.5	Supply Forecast US & Canada .....	6A-58
6A.2.5.1	HDPE Short-term Supply Forecast .....	6A-61
6A.2.5.2	North America Shale Gas-Consequences for the global HDPE market.....	6A-60
6A.2.6	HDPE Pricing Trends, US & Canada.....	6A-63
6A.2.7	SWOT Analysis, US & Canada .....	6A-63
6A.3	MEXICO HDPE MARKET ANALYSIS .....	6A-66
6A.3.1	Introduction.....	6A-66
6A.3.1.1	Economic Indicators.....	6A-66
6A.3.2	Demand Analysis, Mexico.....	6A-66



## TABLE OF CONTENTS (CONT'D)

6A.3.2.1 Introduction .....	6A-66
6A.3.2.2 Historical Demand 2000-2010 .....	6A-68
6A.3.2.3 Demand for HDPE by Type, 2010 .....	6A-68
6A.3.2.4 Demand for HDPE by Application.....	6A-68
6A.3.2.4.1 Film.....	6A-70
6A.3.2.4.2 Blow molding.....	6A-70
6A.3.2.4.3 Injection molding (IM). ....	6A-74
6A.3.2.4.4 Pipe.....	6A-79
6A.3.2.4.5 Others .....	6A-79
6A.3.2.5 Summary of Demand for Bimodal HDPE by Application, 2010 .....	6A-79
6A.3.2.6 Demand for MDPE by Application, 2010 .....	6A-83
6A.3.3 Demand Forecast, Mexico .....	6A-83
6A.3.3.1 Economic Outlook.....	6A-83
6A.3.3.2 HDPE Short-Term Demand Forecast.....	6A-86
6A.3.3.3 Growth Driver Tree Analysis .....	6A-87
6A.3.3.3.1 Pipe .....	6A-87
6A.3.3.3.2 Blow molding.....	6A-90
6A.3.3.3.3 Injection Molding .....	6A-90
6A.3.3.3.4 Film.....	6A-91
6A.3.3.3.5 Rotomolding .....	6A-92
6A.3.3.3.6 Other Markets .....	6A-92
6A.3.3.4 Growth Driver Tree for Bimodal HDPE.....	6A-92
6A.3.3.5 Growth Driver Tree for MDPE.....	6A-93
6A.3.4 Supply Analysis, Mexico.....	6A-93
6A.4.4.1 Introduction.....	6A-93
6A.4.4.2 Historical Supply for HDPE, 2000-2010 .....	6A-93
6A.3.4.3 Supply for HDPE by Process Type, 2010 .....	6A-95
6A.3.4.4 Supply for HDPE by Producer, 2010 .....	6A-95
6A.3.4.5 Supply for HDPE by Technology, 2010 .....	6A-95
6A.3.5 Supply Forecast, Mexico.....	6A-97
6A.3.5.1 HDPE Short-term Supply Forecast .....	6A-97
6A.3.6 Mexico SWOT Analysis.....	6A-99
<b>CHAPTER 6B LATIN AMERICA HDPE MARKET ANALYSIS</b>	
6B.1 INTRODUCTION.....	6B-1
6B.1.2 Supply.....	6B-1
6B.1.3 Demand.....	6B-3
6B.1.4 Trade .....	6B-3
6B.2 INTRODUCTION.....	6B-3
6B.2.1 Major Regions .....	6B-3
6B.2.2 Economic Indicators.....	6B-8
6B.3 DEMAND ANALYSIS.....	6B-8



## TABLE OF CONTENTS (CONT'D)

6B.3.1 Introduction.....	6B-8
6B.3.2 Historical Demand for HDPE, 2000-2010 .....	6B-11
6B.3.3 Demand for HDPE, 2010.....	6B-15
6B.3.4 Demand for HDPE by Type, 2010.....	6B-16
6B.3.5 Demand for HDPE by Application, 2010 .....	6B-16
6B.3.5.1 Film.....	6B-16
6B.3.5.2 Blowmolding .....	6B-20
6B.3.5.3 Injection Molding .....	6B-20
6B.3.5.4 Pipe .....	6B-20
6B.3.5.5 Others.....	6B-23
6B.3.6 Demand Summary for Bimodal HDPE by Application, 2010..	6B-23
6B.3.7 Summary of Demand for MDPE by Application, 2010.....	6B-26
6B.4 DEMAND FORECAST .....	6B-26
6B.4.1 Economic Indicators .....	6B-26
6B.4.2 HDPE Short-term Demand Forecast.....	6B-30
6B.4.3 HDPE Growth Driver Tree Analysis .....	6B-32
6B.4.3.1 Pipe .....	6B-32
6B.4.3.2 Blow molding.....	6B-35
6B.4.3.3 Injection molding .....	6B-35
6B.4.3.4 Film.....	6B-35
6B.4.3.5 Rotomolding and Others .....	6B-36
6B.4.3.6 Growth Tree for bimodal HDPE .....	6B-36
6B.4.3.7 Growth Tree for MDPE.....	6B-37
6B.5 SUPPLY ANALYSIS .....	6B-37
6B.5.1 Historical Supply for HDPE, 2000-2010 .....	6B-37
6B.5.2 Supply for HDPE by Region .....	6B-39
6B.5.3 Supply for HDPE by Process Type, 2010 .....	6B-39
6B.5.4 Supply for HDPE by Process Technology, 2010.....	6B-42
6B.5.5 Supply for HDPE by Producer, 2010.....	6B-42
6B.6 SUPPLY FORECAST. ....	6B-47
6B.6.1 HDPE Short-term Supply Forecast .....	6B-47
6B.7 LATIN AMERICA HDPE SWOT ANALYSIS.....	6B-51
<b>CHAPTER 6C WESTERN EUROPE HDPE MARKET ANALYSIS</b>	
6C.1 INTRODUCTION .....	6C-1
6C.1.1 Major Regions .....	6C-1
6C.1.2 Economic Indicator.....	6C-1
6C.2 DEMAND ANALYSIS.....	6C-1
6C.2.1 Introduction .....	6C-1
6C.2.2 Historical Demand for HDPE, Western Europe, 2000-2010 .....	6C-4
6C.2.3 Demand for HDPE by Region, Western Europe, 2010.....	6C-5
6C.2.4 Demand for HDPE by Type, 2010 .....	6C-8
6C.2.5 Demand for HDPE by Application, Western Europe, 2010.....	6C-11



## TABLE OF CONTENTS (CONT'D)

6C.2.5.1 Blow molding .....	6C-11
6C.2.5.2 Injection Molding (IM).....	6C-15
6C.2.5.3 Film .....	6C-17
6C.2.5.4 Pipe.....	6C-17
6C.2.5.5 Other Applications.....	6C-19
6C.2.6 Demand Summary for Bimodal HDPE Application, 2010.....	6C-23
6C.2.7 Demand Summary for MDPE by Application, 2010.....	6C-23
<b>6C.3 DEMAND FORECAST .....</b>	<b>6C-23</b>
6C.3.1 Economic Outlook.....	6C-26
6C.3.2 HDPE Short-term Demand Forecast .....	6C-26
6C.3.3 HDPE Growth Driver Tree Analysis .....	6C-30
6C.3.3.1 Pipe .....	6C-30
6C.3.3.2 Injection Molding .....	6C-32
6C.3.3.3 Film .....	6C-32
6C.3.3.4 Blow molding .....	6C-33
6C.3.3.5 Other Applications.....	6C-34
6C.3.4 Growth Driver Tree for bimodal HDPE.....	6C-34
6C.3.5 Growth Driver Tree for MDPE.....	6C-35
<b>6C.4 SUPPLY ANALYSIS .....</b>	<b>6C-35</b>
6C.4.1 Introduction .....	6C-35
6C.4.2 Historical Supply for HDPE, 2000-2010.....	6C-37
6C.4.3 Regional Supply for HDPE, 2010.....	6C-37
6C.4.4 Supply for HDPE by process type, 2010.....	6C-40
6C.4.5 Supply for HDPE by Technology, 2010. ....	6C-40
6C.4.6 Supply for HDPE by Producer, 2010. ....	6C-44
<b>6C.5 SUPPLY FORECAST .....</b>	<b>6C-47</b>
6C.5.1 HDPE Short-term Supply Forecast.....	6C-47
6C.5.2 Future trends in West European HDPE Supply.....	6C-51
<b>6C.6 HDPE EUROPEAN PRICING ANALYSIS.....</b>	<b>6C-54</b>
<b>6C.7 WEST EUROPE HDPE SWOT ANALYSIS.....</b>	<b>6C-54</b>
<b>CHAPTER 6D EASTERN EUROPE HDPE MARKET ANALYSIS</b>	
<b>6D.1 INTRODUCTION.....</b>	<b>6D-1</b>
6D.1.1 Economic Indicators.....	6D-1
<b>6D.2 DEMAND ANALYSIS.....</b>	<b>6D-1</b>
6D.2.1 Introduction.....	6D-1
6D.2.2 Historical Demand, Eastern Europe.....	6D-5
6D.2.3 Demand for HDPE by Region, Eastern Europe, 2010.....	6D-7
6D.2.4 Demand for HDPE by Type, 2010.....	6D-9
6D.2.5 Demand for HDPE by Application, Eastern Europe, 2010.....	6D-11
6D.2.5.1 Blow molding.....	6D-11
6D.2.5.2 Injection Molding .....	6D-14
6D.2.5.3 Film .....	6D-16



## TABLE OF CONTENTS (CONT'D)

6D.2.5.4 Pipe.....	6D-17
6D.2.5.5 Others .....	6D-19
6D.2.6 Demand Summary for Bimodal HDPE, Eastern Europe, 2010..	
.....	6D-19
6D.2.7 Demand Summary for MDPE by Application, Eastern Europe, 2010	
.....	6D-22
6D.3 DEMAND FORECAST .....	6D-22
6D.3.1 Economic Indicators and Outlook .....	6D-25
6D.3.2 HDPE Short-term Demand Forecast .....	6D-25
6D.3.3 HDPE Growth Driver Tree Analysis. ....	6D-29
6D.3.3.1 Pipe.....	6D-29
6D.3.3.2 Blow molding.....	6D-31
6D3.3.3 Film .....	6D-31
6D.3.3.4 Injection molding .....	6D-33
6D.3.3.5 Others .....	6D-33
6D.3.4 Growth Driver Tree for Bimodal HDPE.....	6D-34
6D.3.5 Growth Driver Tree for MDPE.....	6D-34
6D.4 SUPPLY ANALYSIS.....	6D-34
6D.4.1 Introduction.....	6D-34
6D.4.2 Historical Supply for HDPE, 2000-2010.....	6D-36
6D.4.3 Regional Supply for HDPE, 2010.....	6D-36
6D.4.4 Supply for HDPE by Process type, 2010.....	6D-38
6D.4.5 Supply for HDPE by Technology, 2010.....	6D-40
6D.4.6 Supply for HDPE by Producer, 2010.....	6D-40
6D.5 SUPPLY FORECAST.....	6D-45
6D.5.1 HDPE Short-term Supply Forecast.....	6D-45
6D.6 PRICING TRENDS IN EASTERN EUROPE.....	6D-49
6D.7 EASTERN EUROPE HDPE SWOT ANALYSIS.....	6D-51
<b>CHAPTER 6E1 ASIA SUPPLY, DEMAND &amp; TRENDS ANALYSIS</b>	
6E1.1 INTRODUCTION.....	6E1-1
6E1.2 SUMMARY .....	6E1-1
6E1.2.1 Asia Supply by Region, 2010 .....	6E1-1
6E1.2.2 Asia Demand, by Application, 2010 .....	6E1-1
6E1.2.3 Asia HDPE Demand, by Region, 2010 .....	6E1-3
6E1.2.4 Asia HDPE Demand, by Modality, 2010 .....	6E1-3
6E1.2.5 Asia Bimodal HDPE Demand, by Application, 2010.....	6E1-3
6E1.2.6 Asia Bimodal HDPE Demand, by Region, 2010 .....	6E1-7
6E1.2.7 Asia MDPE Demand, by Application.....	6E1-7
6E1.2.8 Asia MDPE Demand, by Region, 2010 .....	6E1-7
6E1.3 TRADE FLOW PATTERNS, 2010 .....	6E1-11
6E1.4 ASIA OPERATING BALANCE, 2010.....	6E1-11



## TABLE OF CONTENTS (CONT'D)

### CHAPTER 6E2 JAPAN HDPE MARKET ANALYSIS

6E2.1 INTRODUCTION.....	6E2-1
6E2.1.1 Economic Indicators.....	6E2-1
6E2.2 DEMAND ANALYSIS.....	6E2-1
6E2.2.1 Introduction.....	6E2-1
6E2.2.2 Historical Demand for HDPE, 2000-2010.....	6E2-3
6E2.2.3 Demand for HDPE by Type, 2010.....	6E2-5
6E2.2.4 Demand for HPDE by Application, 2010.....	6E2-5
6E2.2.4.1 Film.....	6E2-5
6E2.2.4.2 Blowmolding.....	6E2-9
6E2.2.4.3 Injection molding.....	6E2-9
6E2.2.4.4 Pipe.....	6E2-9
6E2.2.4.5 Others.....	6E2-12
6E2.2.5 Bimodal HDPE Demand by Application, 2010.....	6E2-12
6E2.2.6 Demand Summary for MDPE by Application, 2010.....	6E2-12
6E2.3 DEMAND FORECAST.....	6E2-15
6E2.3.1 Economic Outlook.....	6E2-15
6E2.3.2 HPDE Short-term Demand Forecast.....	6E2-15
6E2.3.3 HDPE Growth Driver Tree Analysis.....	6E2-19
6E2.3.3.1 Blow Molding.....	6E2-19
6E2.3.3.2 Pipe.....	6E2-19
6E2.3.3.3 Injection Molding.....	6E2-22
6E2.3.3.4 Film.....	6E2-22
6E2.3.3.5 Others.....	6E2-22
6E2.3.4 Growth Driver Tree for Bimodal HDPE.....	6E2-22
6E2.3.5 Growth Driver Tree for MDPE.....	6E2-23
6E2.4 SUPPLY ANALYSIS.....	6E2-23
6E2.4.1 Historical Supply for HDPE, 2000-2010.....	6E2-23
6E2.4.2 Supply for HDPE by Process Type, 2010.....	6E2-26
6E2.4.3 Supply for HDPE by Technology, 2010.....	6E2-26
6E2.4.4 Supply for HDPE by Producer, 2010.....	6E2-26
6E2.4.5 Trends amongst Japanese HDPE Producers 2010.....	6E2-30
6E2.5 SUPPLY FORECAST.....	6E2-33
6E2.5.1 HDPE Short-term Supply Forecast.....	6E2-33
6E2.6 JAPAN HDPE SWOT ANALYSIS.....	6E2-33

### CHAPTER 6E3 CHINA HDPE MARKET ANALYSIS

6E3.1 INTRODUCTION.....	6E3-1
6E3.1.1 Economic Indicators.....	6E3-1
6E3.2 DEMAND ANALYSIS.....	6E3-1
6E3.2.1 Introduction.....	6E3-1
6E3.2.2 Historical Demand for HDPE, 2000-2010.....	6E3-3
6E3.2.3 Demand for HDPE by Type, 2010.....	6E3-5



## TABLE OF CONTENTS (CONT'D)

6E3.2.4 Demand for HDPE by Application, 2010.....	6E3-8
6E3.2.5 Demand for Bimodal HDPE by Application, 2010.....	6E3-13
6E3.2.6 Demand for MDPE by Application, 2010.....	6E3-13
6E3.3 DEMAND FORECAST.....	6E3-15
6E3.3.1 Economic Outlook.....	6E3-15
6E3.3.2 HDPE Short-term Demand Forecast.....	6E3-15
6E3.3.3 HDPE Growth Driver Tree Analysis.....	6E3-18
6E3.3.4 Growth Driver Tree for Bimodal HDPE.....	6E3-21
6E3.3.5 Growth Driver Tree for MDPE.....	6E3-21
6E3.4 SUPPLY ANALYSIS.....	6E3-22
6E3.4.1 Introduction.....	6E3-22
6E3.4.2 Historical Supply for HDPE, 2000-2010.....	6E3-22
6E3.4.3 Supply for HDPE by Process Type, 2010.....	6E3-24
6E3.4.4 Supply for HDPE by Technology, 2010.....	6E3-24
6E3.4.5 Supply for HDPE by Producer, 2010.....	6E3-28
6E3.4.6 Supply for Bimodal HDPE by Producer, 2010.....	6E3-30
6E3.5 SUPPLY FORECAST.....	6E3-33
6E3.5.1 HDPE Short-term Supply Forecast.....	6E3-33
6E3.6 CHINA HDPE SWOT ANALYSIS.....	6E3-33
<b>CHAPTER 6E4 INDIA HDPE MARKET ANALYSIS</b>	
6E4.1 INTRODUCTION.....	6E4-1
6E4.1.1 Economic indicators.....	6E4-1
6E4.2 DEMAND ANALYSIS.....	6E4-1
6E4.2.1 Introduction.....	6E4-1
6E4.2.2 Historical Demand for HDPE, 2000-2010.....	6E4-3
6E4.2.3 Demand for HDPE by Type, 2010.....	6E4-6
6E4.2.4 Demand for HDPE Application, 2010.....	6E4-6
6E4.2.4.1 Blowmolding.....	6E4-6
6E4.2.4.2 Film.....	6E4-9
6E4.2.4.3 Fibers & Raffia.....	6E4-11
6E4.2.4.4 Pipe.....	6E4-11
6E4.2.4.5 Injection Molding.....	6E4-13
6E4.2.4.6 Others.....	6E4-15
6E4.2.5 Demand for HDPE by Application Sector.....	6E4-15
6E4.2.6 Summary of Demand for Bimodal HDPE by Application, 2010.....	6E4-18
6E4.2.7 Summary of Demand for MDPE by Application, 2010.....	6E4-18
6E4.3 DEMAND FORECAST.....	6E4-20
6E4.3.1 Economic Indicators.....	6E4-20
6E4.3.2 HDPE Short-term Demand Forecast.....	6E4-20
6E4.3.3 HDPE Growth Driver Tree Analysis.....	6E4-23
6E4.3.3.1 Blow Molding.....	6E4-23



## TABLE OF CONTENTS (CONT'D)

6E4.3.3.2 Film.....	6E4-26
6E4.4 SUPPLY ANALYSIS.....	6E4-28
6E4.4.1 Introduction.....	6E4-28
6E4.4.2 Historical Supply for HDPE.....	6E4-28
6E4.4.3 Supply for HDPE by Process type, 2010.....	6E4-28
6E4.4.4 Supply for HDPE by Technology, 2010.....	6E4-32
6E4.4.5 Supply for HDPE by Producer, 2010.....	6E4-32
6E4.5 SUPPLY FORECAST.....	6E4-35
6E4.5.1 HDPE Short-term Supply Forecast.....	6E4-35
6E4.6 INDIA HDPE SWOT ANALYSIS.....	6E4-39
<b>CHAPTER 6E5: SOUTH KOREA HDPE MARKET ANALYSIS</b>	
6E5.1 INTRODUCTION.....	6E5-1
6E5.1.1 Economic Indicators.....	6E5-1
6E5.2 DEMAND ANALYSIS.....	6E5-1
6E5.2.1 Introduction.....	6E6-1
6E5.2.2 Historical Demand.....	6E5-3
6E5.2.3 Demand for HDPE by Type, 2010.....	6E5-6
6E5.2.4 Demand for HDPE by Application.....	6E5-6
6E5.2.4.1 Film.....	6E5-6
6E5.2.4.2 Blow Molding.....	6E5-10
6E5.2.4.3 Injection Molding.....	6E5-10
6E5.2.4.4 Pipe and Conduit.....	6E5-10
6E5.2.5 Demand for Bimodal HDPE by Application.....	6E5-10
6E5.2.6 Demand for MDPE by Application.....	6E5-13
6E5.3 DEMAND FORECAST.....	6E5-13
6E5.3.1.Economic Outlook.....	6E5-13
6E5.3.2. Short-term Demand Forecast.....	6E5-13
6E5.3.3. HDPE Growth Driver Tree Analysis.....	6E5-17
6E5.3.3.1 Pipe and Conduit.....	6E5-17
6E5.3.3.2 Injection Molding.....	6E5-20
6E5.3.3.3.Blow Molding.....	6E5-20
6E5.3.3.4 Films.....	6E5-20
6E5.3.3.5 Others.....	6E5-20
6E5.3.4 Growth Driver Tree for Bimodal.....	6E5-20
6E5.3.5 Growth Driver Tree for MDPE.....	6E5-21
6E5.4 SUPPLY ANALYSIS.....	6E5-21
6E5.4.1 Introduction.....	6E5-21
6E5.4.2 Historical Supply of HDPE.....	6E5-23
6E5.4.3 Supply for HDPE by Process.....	6E5-23
6E5.4.4 Supply for HDPE by Producer.....	6E5-23
6E5.4.5 Supply for HDPE by Technology.....	6E5-27
6E5.5 SUPPLY FORECAST.....	6E5-29



## TABLE OF CONTENTS (CONT'D)

6E5.5.1 HDPE Short-term Supply Forecast.....	6E5-29
6E5.6 SOUTH KOREA HDPE SWOT ANALYSIS.....	6E5-32
<b>CHAPTER 6E6: REST OF ASIA HDPE MARKET ANALYSIS</b>	
6E6.1 INTRODUCTION.....	6E6-1
6E6.2 DEMAND ANALYSIS .....	6E6-1
6E6.2.1 Introduction.....	6E6-1
6E6.2.2 Historical Demand.....	6E6-2
6E6.2.3 Demand for HDPE by Region.....	6E6-5
6E6.2.4 Demand for HDPE by Application... ..	6E6-5
6E6.2.5 Growth Driver Tree Analysis.....	6E6-8
6E6.3 SUPPLY ANALYSIS .....	6E6-8
6E6.3.1.Introduction.....	6E6-10
6E6.3.2. Historical Supply for HDPE.. ..	6E6-10
6E6.3.3. HDPE Supply by Region.....	6E6-10
6E6.3.4 HDPE Supply by Producer.....	6E6-13
6E5.3.5 HDPE Supply by Process.....	6E6-13
6E6.3.6 HDPE Supply by Technology.....	6E6-17
6E6.4 SUPPLY FORECAST.....	6E6-17
6E6.4.1 HDPE Short-term Supply Forecast.....	6E6-17
<b>CHAPTER 6F: THE MIDDLE EAST AND AFRICA HDPE MARKET ANALYSIS</b>	
6F.1 INTRODUCTION.....	6F-1
6F.2 DEMAND ANALYSIS .....	6F-1
6F.2.1 Historical Demand .....	6F-1
6F.2.2 HDPE Demand by Region.....	6F-3
6F.2.3 HDPE Demand by Application.....	6F-3
6F.2.4 HDPE Demand by Type .....	6F-5
6F.2.5 Bimodal Demand by Application.....	6F-5
6F.2.6 Demand by Type HDPE vs. MDPE.....	6F-5
6F.2.7 MDPE Demand by Application.....	6F-9
6F.3 DEMAND FORECAST .....	6F-9
6F.3.1.HDPE Short-term Demand Forecast.....	6F-9
6F.3.2. Growth Driver Tree.....	6F-12
6F.4 SUPPLY ANALYSIS .....	6F-14
6F.4.1 HDPE Supply by Region .....	6F-17
6F.5 SUPPLY FORECAST.....	6F-22
6F.5.1 HDPE Short-term Forecast .....	6F-22
6F.5.2 HDPE Supply Analysis .....	6F-24
6F.6 HDPE NET TRADE ANALYSIS.....	6F-25
6F.7 HDPE The MIDDLE EAST/AFRICA SUPPLY/DEMAND BALANCE.....	6F-29
6F.8 HDPE The MIDDLE EAST/AFRICA SUPPLY/DEMAND CONCLUSIONS.....	6F-29



## TABLE OF CONTENTS (CONT'D)

### CHAPTER 7: TECHNOLOGY ANALYSIS

7.1 INTRODUCTION.....	7-1
7.2 HDPE PRODUCTION PROCESSES .....	7-1
7.2.1 Slurry Processes.....	7-2
7.2.1.1. Phillips Slurry Loop Process.....	7-2
7.2.1.2 Ineos Slurry Loop Process – INNOVENE S.....	7-7
7.2.1.3 LBI's HOSTALEN Advanced Cascade Process.....	7-10
7.2.1.4 Mitsui CX Process .....	7-13
7.2.1.5 Equistar Maruzen Process (not for license).....	7-14
7.2.1.6 Borealis BORSTAR Process (not for license) .....	7-14
7.2.2 Gas Phase Processes.....	7-17
7.2.2.1 Univation's Unipol PE Process .....	7-17
7.2.2.2 Ineos Innovene G Process .....	7-19
7.2.2.3 LBI's SPHERILENE C Process .....	7-22
7.2.3 Solution Processes.....	7-24
7.2.3.1 Dow's DOWLEX process (not for license).....	7-24
7.2.3.2 Stamicarbon COMPACT Solution Process (not for license).....	7-24
7.2.3.3. Nova's SCLAIRTECH and AST.....	7-26
7.3 COMMENTS ON BIMODAL HDPE AND BIMODAL LLDPE PROCESSES.....	7-28
7.4 COMMENTS ON FOUR BIMODAL TECHNOLOGIES.....	7-29
7.4.1 HOSTALEN .....	7-29
7.4.2 Mitsui CX .....	7-30
7.4.3 INNOVENE S .....	7-30
7.4.4. SPHERILENE C .....	7-31
7.5 COMMENTS ON MANUFACTURING COST FOR FOUR PROCESSES .....	7-31

### CHAPTER 8: CATALYSTS

8.1 INTRODUCTION .....	8-1
8.1.1 LDPE .....	8-1
8.1.2 HDPE.....	8-1
8.1.3 LLDPE .....	8-2
8.1.4 Metallocene .....	8-2
8.2 CHROMIUM CATALYSTS.....	8-3
8.2.1 Introduction.....	8-3
8.2.2 History and Development.....	8-5
8.2.3 Fundamentals of Cr/Silica.....	8-6
8.2.3.1 Catalyst Preparation .....	8-6
8.2.3.2 Pore Volume (PV) .....	8-8
8.2.3.4 Cocatalyst .....	8-8
8.2.3.5 Reactor Temperature .....	8-9
8.2.3.6 Activation Temperature .....	8-9
8.2.3.7 Promotion by Titania (Titanium Oxide).....	8-9
8.2.4 Relationship between Catalyst, Process, and Resin .....	8-9
8.2.5 Industry Structure .....	8-12



## TABLE OF CONTENTS (CONT'D)

8.2.6 Major Suppliers.....	8-12
8.2.6.1 Grace Davison.....	8-14
8.2.6.2 PQ Corporation (Philadelphia Quartz).....	8-14
8.2.6.3 Sinopec (Sinopec Catalyst company).....	8-16
8.2.6.4 Univation.....	8-16
8.2.6.5 Competitive Assessment of Suppliers.....	8-17
8.2.6.6 Unmet Needs.....	8-17
8.3 ZIEGLER NATTA POLYETHYLENE CATALYSTS.....	8-17
8.3.1 Introduction.....	8-17
8.3.2 History and Development.....	8-19
8.3.3 Fundamentals of Ziegler Catalyst.....	8-20
8.3.4 Relationship between Catalyst, Process, and Resin.....	8-20
8.3.5 Industry Structure.....	8-22
8.3.6 Major Suppliers and Product Portfolio.....	8-23
8.3.6.1 Univation.....	8-23
8.3.6.2 LyondellBasell.....	8-25
8.3.6.3 INEOS.....	8-28
8.3.6.4 Mitsui.....	8-28
8.3.6.5 Grace Davison.....	8-28
8.3.6.6. BASF Catalyst.....	8-29
8.3.6.7 SINOPEC (SCC).....	8-29
8.3.6.8 Comparative Assessment of Suppliers.....	8-32

## CHAPTER 9: APPENDIX – List of Global Technology Licensees

9.1 Gas Phase Processes	
9.1.1 UNIPOL.....	9-1
9.1.2 INNOVENE G.....	9-4
9.1.3 SPHERILENE S.....	9-5
9.2 Slurry Processes	
9.2.1 Chevron Phillips.....	9-6
9.2.2 INNOVENE S.....	9-7
9.2.3 MITSUI CX.....	9-8
9.2.4 HOSTALEN.....	9-9
9.3 Solution Process	
9.3.1 Sclairtech.....	9-10



## LIST OF EXHIBITS

### CHAPTER 1: EXECUTIVE SUMMARY

Exhibit 1-1 Classification of Polyolefins Catalysts .....	1-4
Exhibit 1-2 Industrial structure of Chromium Catalysts .....	1-6
Exhibit 1-3 Industry Structure of Z/N PE Catalysts.....	1-8
Exhibit 1-4 Commercial HDPE Process Technologies .....	1-9
Exhibit 1-5 Capabilities of Different Low Pressure PE Processes .....	1-10
Exhibit 1-6 Comparisons of the Features of HDPE vs. LLDPE vs. LDPE.....	1-12
Exhibit 1-7 Major End-Uses Blow Molding .....	1-14
Exhibit 1-8 Selected Grades from 10 Producers.....	1-15
Exhibit 1-9 Major End-Uses –Film.....	1-17
Exhibit 1-10 HMW HDPE Films – Selected Grades from 8 Producers .....	1-18
Exhibit 1-11 Major Uses – Injection Molding .....	1-20
Exhibit 1-12 Injection Molding – Selected Grades from 9 Producers.....	1-21
Exhibit 1-13 Major End-Uses- Pipe Applications.....	1-23
Exhibit 1-14 Summary of Pressure Pipe Grades by 7 Producers .....	1-24
Exhibit 1-15 Major End-Uses – Rotomolding .....	1-26
Exhibit 1-16 Summary of Rotational Molding Grades by 6 Producers.....	1-27
Exhibit 1-17 Major End-Uses – Sheet .....	1-28
Exhibit 1-18 Summary of Sheet Grades by 6 HDPE Producers .....	1-29
Exhibit 1-19 Global HDPE Supply by Region.....	1-31
Exhibit 1-20 Global HDPE Capacity by Process Type, 2010 .....	1-32
Exhibit 1-21 Global HDPE Capacity by Process Type, 2010 .....	1-34
Exhibit 1-22 Global HDPE Capacity by Modality, 2010.....	1-35
Exhibit 1-23 Global HDPE Capacity by Technology, 2010 .....	1-36
Exhibit 1-23 (Continued) Global HDPE Capacity by Technology, 2010.....	1-37
Exhibit 1-24 Markets vs. Technology Position for HDPE/MDPE.....	1-39
Exhibit 1-25 Global HDPE by Producer, 2010.....	1-40
Exhibit 1-26 Global HDPE Capacity to Top Producers by Region, 2010.....	1-41
Exhibit 1-26 (Continued) Global HDPE Capacity to Top Producers by Region, 2010.....	1-42
Exhibit 1-27 Feedstock Integration by Producers by Region .....	1-43
Exhibit 1-28 Global HDPE Capacity Addition by Region, 2010-2015 .....	1-44
Exhibit 1-29 Global Demand for HDPE Historical.....	1-46
Exhibit 1-29 (Continued) Global Demand for HDPE by Region Historical.....	1-47
Exhibit 1-30 Global HDPE Demand by Region, 2010 .....	1-48
Exhibit 1-31 Global Demand for HDPE by Modality, 2010.....	1-50
Exhibit 1-32 Global Demand by Application,2010.....	1-51
Exhibit 1-33 Global Demand by Application and Modality.....	1-52
Exhibit 1-34 Regional Growth and per capita Consumption, 2010 .....	1-52
Exhibit 1-35 Market Attractiveness vs. Opportunity Index.....	1-55
Exhibit 1-36 Regional Growth and Regional Demand.....	1-56



## LIST OF EXHIBITS (CONT'D)

Exhibit 1-37 Global Demand for Bimodal HDPE by Region.....	1-58
Exhibit 1-38 Global Demand for Bimodal HDPE by Application.....	1-59
Exhibit 1-39 Global Demand for MDPE by Region .....	1-61
Exhibit 1-40 Global Demand for MDPE by Application .....	1-62
Exhibit 1-41 HDPE Demand Growth by Application, 2010-2015-2020.....	1-64
Exhibit 1-42 Demand Growth by Application, Modality, and Density.....	1-65
Exhibit 1-43 Global Operating Balance .....	1-66
Exhibit 1-44 Global Supply/Demand Balance, 1995-2015 .....	1-67
Exhibit 1-45 HDPE – Intermaterial Competition .....	1-69

### CHAPTER 2: INTRODUCTION

Exhibit 2-1 CMR Methodology.....	2-5
Exhibit 2-2 List of Abbreviations.....	2-7

### CHAPTER 3: STRATEGIC ANALYSIS

Exhibit 3-1 HDPE Producer Participation in the Middle East .....	3-6
Exhibit 3-2 Potential Polyethylene Expansions from Shale Gas.....	3-7
Exhibit 3-3 Global Shale Gas Distribution .....	3-9
Exhibit 3-4 Global HDPE Capacity by Process Type, 2010.....	3-10
Exhibit 3-5 HDPE Capacity by Modality, 2010 .....	3-12
Exhibit 3-6 HDPE Capacity by Technology, 2010.....	3-13
Exhibit 3-6B HDPE Capacity by Licensor, 2010.....	3-14
Exhibit 3-7 HDPE Capacity by Technology and Region, 2010 .....	3-15
Exhibit 3-8 HDPE/MDPE Market vs. Technology Position.....	3-16
Exhibit 3-9 Global HDPE Capacity by Producer.....	3-18
Exhibit 3-10 Global HDPE Capacity of Top Producer by Region, 2010.....	3-32
Exhibit 3-11 Total JV Capacity by Producer and Region, 2010 .....	3-33
Exhibit 3-12 Feedstock Integration by Producer, by Region .....	3-34
Exhibit 3-13 Product Focus by Producer.....	3-35
Exhibit 3-14 Analysis of Metallocene in Major HDPE Applications .....	3-38
Exhibit 3-15 Regional Growth & Per Capita Consumption of HDPE, 2010.....	3-40
Exhibit 3-16 Market Attractiveness and Opportunity Index.....	3-42
Exhibit 3-17 Regional Growth and Regional Demand, 2010.....	3-43

### CHAPTER 4: APPLICATION PROFILE

Exhibit 4-1 HDPE Comparison of Key Features of HDPE vs. LLDPE vs. LDPE .....	4-2
Exhibit 4-2 Major End-Uses Blow Molding .....	4-6
Exhibit 4-3 Selected Grades from 10 Producers .....	4-8
Exhibit 4-4 Global Multi-Attribute Analysis –Blow Molding Applications .....	4-9
Exhibit 4-5 Major End-Uses –Films .....	4-12
Exhibit 4-6 HMW HDPE Films – Selected Grades from 8 Producers .....	4-13
Exhibit 4-7 Multi-Attribute Analysis –Film Applications.....	4-15
Exhibit 4-8 Major Uses – Injection Molding .....	4-17
Exhibit 4-9 Injection Molding – Selected Grades from 9 Producers.....	4-18



## LIST OF EXHIBITS (CONT'D)

Exhibit 4-10 Multi-Attribute Analysis –Injection Molding Applications .....	4-20
Exhibit 4-11 Major Uses – Pipes .....	4-23
Exhibit 4-12 Classification of Pipes and Conduits .....	4-25
Exhibit 4-13 Summary of Pressure Pipe Grades by 7 Producers .....	4-27
Exhibit 4-14 Independent Listing of PE-100 Resins .....	4-32
Exhibit 4-15 Independent Listing of PE-4710 .....	4-34
Exhibit 4-16 Glossary of Pipe Resins .....	4-35
Exhibit 4-17 MOP for HDPE SDR 11 Pipe – Gas Distribution .....	4-36
Exhibit 4-18 MOP for HDPE SDR 11 Pipe – Water Transporting .....	4-37
Exhibit 4-19 Multi-Attribute Analysis –Pipe Applications .....	4-39
Exhibit 4-20 Major Uses – Rotomolding .....	4-42
Exhibit 4-21 Summary of Rotational Molding Grades by 6 Producers .....	4-43
Exhibit 4-22 Multi-Attribute Analysis –Rotomolding Applications .....	4-45
Exhibit 4-23 Major Uses – Sheets .....	4-48
Exhibit 4-24 Market of Sheet Grades by 6 HDPE Producers .....	4-49
Exhibit 4-25 Multi-Attribute Analysis –Sheet and Thermoforming Applications .....	4-50

### CHAPTER 5: GLOBAL SUPPLY, DEMAND, AND TRADE ANALYSIS

Exhibit 5-1 Global Supply of HDPE .....	5- 3
Exhibit 5-2 Global HDPE Capacity by Modality, 2010 .....	5-4
Exhibit 5-3 Global HDPE Capacity by Process Type, 2010 .....	5-6
Exhibit 5-4 Global HDPE Capacity by Technology, 2010 .....	5-7
Exhibit 5-5 Global HDPE Capacity by Licensor .....	5-8
Exhibit 5-6 Global HDPE Capacity by Producer .....	5-10
Exhibit 5-7 Company Owned and JV HDPE Capacity by Region .....	5-11
Exhibit 5-8 Global Demand for HDPE by Applications .....	5-12
Exhibit 5-9 Global Demand for HDPE by Regions .....	5-15
Exhibit 5-10 Global Demand for HDPE by Modality .....	5-16
Exhibit 5-11 Global Demand for Bimodal HDPE by Applications 2010 .....	5-17
Exhibit 5-12 Global Demand for Bimodal HDPE by Region, 2010 .....	5-19
Exhibit 5-13 Global Demand for MDPE by Application, 2010 .....	5-20
Exhibit 5-14 Global MDPE Demand by Region, 2010 .....	5-22
Exhibit 5-15 Global HDPE Operating Rate Balance, 2010 .....	5-23
Exhibit 5-16 Global HDPE Demand and Forecast, 2010-2015-2020 .....	5-24
Exhibit 5-17 Global MDPE Demand and Forecast, 2010-2015 2020 .....	5-24
Exhibit 5-18 Growth Driver Tree Analysis for HDPE, 2010-2015-2020 .....	5-26
Exhibit 5-19 Growth Drive Tree Analysis for Bimodal HDPE, 2010-2015-2020 .....	5-28
Exhibit 5-20 Growth Drive Tree Analysis for MDPE, 2010-2015-2020 .....	5-28
Exhibit 5-21 HDPE Demand Growth by Region, 2010-2015-2020 .....	5-30
Exhibit 5-22 Announced Global HDPE Capacity Addition, 2010-2015 .....	5-31
Exhibit 5-23 Global HDPE Capacity Addition by Region, 2010-2015 .....	5-32
Exhibit 5-24 Announced Region Capacity Additions, 2010-2015 .....	5-34



## LIST OF EXHIBITS (CONT'D)

### CHAPTER 6A: NORTH AMERICA HDPE MARKET ANALYSIS

Exhibit 6A-1 N. America HDPE Capacity by Country .....	6A- 2
Exhibit 6A-2 N. America HDPE Capacity by Producer .....	6A- 3
Exhibit 6A-3 N. America HDPE Capacity Growth, 2010-2015-2020 .....	6A-5
Exhibit 6A-4 N. America HDPE Demand .....	6A-6
Exhibit 6A-5 N. America HDPE Demand by Application .....	6A-7
Exhibit 6A-6 N. America HDPE Growth Rate... ..	6A-9
Exhibit 6A-7 N. America HDPE Trade, 2010 .....	6A-10
Exhibit 6A-8 N. America Trade Operating Balance.....	6A-11
Exhibit 6A-9 GDP and GDP Growth of USA and Canada.....	6A-13
Exhibit 6A-10 USA and Canada HDPE Demand -Historical .....	6A-15
Exhibit 6A-11 USA and Canada HDPE Demand by Country .....	6A-18
Exhibit 6A-12 USA and Canada Demand by Modality and Type .....	6A-20
Exhibit 6A-13 USA and Canada Demand by Application and Modality .....	6A-21
Exhibit 6A-14 USA and Canada Blow Molding Application and Modality .....	6A-23
Exhibit 6A-15 USA and Canada injection Molding Applications .....	6A-25
Exhibit 6A-16 USA and Canada Film Applications and Modality .....	6A-28
Exhibit 6A-17 USA and Canada Pipe Applications .....	6A-30
Exhibit 6A-18 USA and Canada Pipe Resins by Modality and Type .....	6A-32
Exhibit 6A-19 USA and Canada HDPE Sheet Demand.....	6A-34
Exhibit 6A-20 USA and Canada Rotomolding Demand .....	6A-35
Exhibit 6A-21 USA and Canada Bimodal HDPE by Application .....	6A-37
Exhibit 6A-22 USA and Canada MDPE Demand by Application .....	6A-38
Exhibit 6A-23 USA and Canada GDP Growth .....	6A-40
Exhibit 6A-24 USA and Canada HDPE Growth by Modality .....	6A-41
Exhibit 6A-25 USA and Canada MDPE Growth.....	6A-41
Exhibit 6A-26 USA and Canada Growth Drive Tree, 2010-2015 .....	6A-43
Exhibit 6A-27 USA and Canada Bimodal HDPE Growth Driver Tree .....	6A-47
Exhibit 6A-28 USA and Canada MDPE Growth Driver Tree.....	6A-47
Exhibit 6A-29 USA and Canada Historical Capacity .....	6A-49
Exhibit 6A-30 USA and Canada by Country.....	6A-51
Exhibit 6A-31 USA and Canada HDPE Capacity by Process .....	6A-52
Exhibit 6A-32 USA and Canada HDPE Capacity by Modality.....	6A-53
Exhibit 6A-33 USA and Canada HDPE Suppliers .....	6A-57
Exhibit 6A-34 USA and Canada Capacity by Technology .....	6A-59
Exhibit 6A-35 USA and Canada Producers Technologies and Sites .....	6A-60
Exhibit 6A-36 USA and Canada HDPE Price Trade Historical .....	6A-64
Exhibit 6A-37 USA and Canada HDPE SWOT Analysis.....	6A-64
Exhibit 6A-38 Mexico GDP and GDP Growth .....	6A-67
Exhibit 6A-39 Mexico HDPE Demand Historical .....	6A-69
Exhibit 6A-40 Mexico HDPE Demand by Modality and Type.....	6A-71
Exhibit 6A-41 Mexico HDPE Demand by Application .....	6A-72



## LIST OF EXHIBITS (CONT'D)

Exhibit 6A-42 Mexico HDPE Film Applications and Modality .....	6A-73
Exhibit 6A-43 Mexico Blow Molding Applications and Modality .....	6A-75
Exhibit 6A-44 Mexico Injection Molding Applications .....	6A-77
Exhibit 6A-45 Mexico Rotomolding Applications .....	6A-78
Exhibit 6A-46 Mexico Pipe Applications .....	6A-80
Exhibit 6A-47 Mexico Pipe Demand by Modality and Type .....	6A-81
Exhibit 6A-48 Mexico Sheet Demand by Type.....	6A-82
Exhibit 6A-49 Mexico HDPE Demand by Applications.....	6A-84
Exhibit 6A-50 Mexico MDPE Demand by Application .....	6A-85
Exhibit 6A-51 Mexico GDP, GDP Growth and Forecast .....	6A-86
Exhibit 6A-52 Mexico HDPE Demand by Modality, and Forecast .....	6A-88
Exhibit 6A-53 Mexico MDPE Demand by Type, and Forecast.....	6A-88
Exhibit 6A-54 Mexico HDPE Growth Driver Tree .....	6A-89
Exhibit 6A-55 Mexico Bimodal HDPE Growth Driver Tree.....	6A-94
Exhibit 6A-56 Mexico MDPE Growth Driver Tree .....	6A-94
Exhibit 6A-57 Mexico HDPE Capacity Historical.....	6A-96
Exhibit 6A-58 Mexico HDPE Producers .....	6A-98
Exhibit 6A-59 Mexico HDPE Capacity Addition, 2010-2015 .....	6A-100
Exhibit 6A-60 Mexico HDPE SWOT Analysis .....	6A-101

### CHAPTER 6B: LATIN AMERICA HDPE MARKET ANALYSIS

Exhibit 6B-1 Latin America HDPE Capacity by Country.....	6B- 2
Exhibit 6B-2 Latin America HDPE Capacity by Region .....	6B- 4
Exhibit 6B-3 Latin America GDP, GDP Growth - Historical.....	6B- 5
Exhibit 6B-4 Latin America GDP by Country .....	6B- 6
Exhibit 6B-5 Latin America HDPE Demand –Historical.....	6B- 7
Exhibit 6B-6 Latin America HDPE Demand by Application.....	6B-9
Exhibit 6B-7 Latin America HDPE Demand by Country .....	6B-10
Exhibit 6B-8 Latin America Demand by Modality.....	6B-12
Exhibit 6B-9 Latin America HDPE Demand by Application.....	6B-14
Exhibit 6B-10 Latin America HDPE Film Demand by Modality .....	6B-17
Exhibit 6B-11 Latin America HDPE Blow Molding Demand by Modality .....	6B-18
Exhibit 6B-12 Latin America HDPE Pipe Demand by Modality.....	6B-19
Exhibit 6B-13 Latin America Rotomolding Demand by Type .....	6B-21
Exhibit 6B-14 Latin America Bimodal HDPE by Application .....	6B-22
Exhibit 6B-15 Latin America MDPE Applications .....	6B-24
Exhibit 6B-16 Latin America GDP and GDP Growth Forecast.....	6B-25
Exhibit 6B-17 Latin America Real GDP Forecast by Country .....	6B-27
Exhibit 6B-18 Latin America HDPE Demand and Forecast by Modality.....	6B-28
Exhibit 6B-19 Latin America MDPE Demand and Forecast.....	6B-29
Exhibit 6B-20 Latin America HDPE Growth Drive Tree.....	6B-31
Exhibit 6B-21 Latin America Bimodal HDPE Growth Driver Tree .....	6B-33
Exhibit 6B-22 Latin America MDPE Growth Driver Tree .....	6B-33



## LIST OF EXHIBITS (CONT'D)

Exhibit 6B-23 Latin America HDPE Capacity -Historical .....	6B-34
Exhibit 6B-24 Latin America HDPE Capacity by Country.....	6B-38
Exhibit 6B-25 Latin America HDPE by Process Type .....	6B-38
Exhibit 6B-26 Latin America HDPE Capacity by Modality.....	6B-40
Exhibit 6B-27 Latin America HDPE Capacity by Technology .....	6B-41
Exhibit 6B-28 Latin America HDPE by Producer.....	6B-43
Exhibit 6B-29 Latin America HDPE Producers by Technology and Site.....	6B-44
Exhibit 6B-30 Latin America HDPE Capacity Additions .....	6B-45
Exhibit 6B-31 Latin America HDPE SWOT Analysis.....	6B-48
Exhibit 6B-32 Latin America HDPE Producers.....	6B-49
Exhibit 6B-33 Latin America HDPE Producers.....	6B-50
Exhibit 6B-34 Latin America HDPE Producers.....	6B-52

### CHAPTER 6C: WESTERN EUROPE HDPE MARKET ANALYSIS

Exhibit 6C-1 Western Europe GDP and GDP Growth-Historical .....	6C- 2
Exhibit 6C-2 Western Europe Real GDP by Country .....	6C- 3
Exhibit 6C-3 Western Europe Demand by Application - Historical.....	6C- 4
Exhibit 6C-4 Western Europe Demand - Historical .....	6C- 7
Exhibit 6C-5 Western Europe HDPE Demand by Country.....	6C- 9
Exhibit 6C-6 Western Europe HDPE Demand by Modality and Type... ..	6C-10
Exhibit 6C-7 Western Europe HDPE Demand by Application.....	6C-12
Exhibit 6C-8 Western Europe HDPE Blow Molding Demand by Modality.....	6C-14
Exhibit 6C-9 Western Europe HDPE Injection Molding Demand by Modality.....	6C-16
Exhibit 6C-10 Western Europe HDPE Film Demand by Modality .....	6C-18
Exhibit 6C-11 Western Europe HDPE Pipe Demand by Modality .....	6C-20
Exhibit 6C-12 Western Europe Sheet by Type .....	6C-22
Exhibit 6C-13 Western Europe Rotomolding Demand by Type .....	6C-22
Exhibit 6C-14 Western Europe Bimodal HDPE Demand by Application .....	6C-24
Exhibit 6C-15 Western Europe MDPE Applications .....	6C-25
Exhibit 6C-16 Western Europe Forecasted GDP,2010-2020 .....	6C-27
Exhibit 6C-17 Western Europe Demand Growth by Country .....	6C-28
Exhibit 6C-18 Western Europe HDPE Demand and Forecast by Modality .....	6C-29
Exhibit 6C-19 Western Europe MDPE Demand and Forecast.....	6C-29
Exhibit 6C-20 Western Europe HDPE Growth Drive Tree .....	6C-31
Exhibit 6C-21 Western Europe Bimodal HDPE Growth Driver Tree .....	6C-36
Exhibit 6C-22 Western Europe MDPE Growth Driver Tree .....	6C-36
Exhibit 6C-23 Western Europe HDPE Capacity -Historical .....	6C-38
Exhibit 6C-24 Western Europe HDPE Capacity by Country .....	6C-39
Exhibit 6C-25 Western Europe HDPE by Process.....	6C-41
Exhibit 6C-26 Western Europe HDPE Capacity by Modality .....	6C-42
Exhibit 6C-27 Western Europe HDPE Capacity by Technology .....	6C-43
Exhibit 6C-28 Western Europe HDPE by Supplier.....	6C-46
Exhibit 6C-29 Western Europe Bimodal HDPE by Technology and Site.....	6C-48



## LIST OF EXHIBITS (CONT'D)

Exhibit 6C-30 Western Europe HDPE Producers .....	6C-49
Exhibit 6C-31 Western Europe HDPE Capacity Additions .....	6C-50
Exhibit 6C-32 Western Europe HDPE Capacity Closures.....	6C-50
Exhibit 6C-33 Western Europe HDPE Pricing by Application .....	6C-55
Exhibit 6C-34 Western Europe HDPE SWOT Analysis.....	6C-56

### CHAPTER 6D: EASTERN EUROPE HDPE MARKET ANALYSIS

Exhibit 6D-1 Eastern Europe GDP and GDP Growth-Historical .....	6D- 2
Exhibit 6D-1 (Continued) Eastern Europe Real GDP by Country .....	6D- 3
Exhibit 6D-2 Eastern Europe GDP Market Share by Country - Historical.....	6D- 4
Exhibit 6D-3 Eastern Europe Demand by Application - Historical .....	6D- 6
Exhibit 6D-4 Eastern Europe HDPE Demand -Historical .....	6D- 8
Exhibit 6D-5 Eastern Europe HDPE Demand by Country.....	6D-10
Exhibit 6D-6 Eastern Europe HDPE Demand by Modality .....	6D-12
Exhibit 6D-7 Eastern Europe HDPE Demand by Application.....	6D-13
Exhibit 6D-8 Eastern Europe HDPE Blow Molding Demand by Modality .....	6D-15
Exhibit 6D-9 Eastern Europe HDPE Film Demand by Modality .....	6D-18
Exhibit 6D-10 Eastern Europe HDPE Pipe Demand by Modality and Type .....	6D-20
Exhibit 6D-11 Eastern Europe Rotomolding by Type .....	6D-21
Exhibit 6D-12 Eastern Europe Bimodal HDPE by Application .....	6D-23
Exhibit 6D-13 Eastern Europe MDPE Demand .....	6D-24
Exhibit 6D-14 Eastern Europe GDP Forecast and Growth Forecast .....	6D-26
Exhibit 6D-15 Eastern Europe HDPE Regional Demand Growth by Country.....	6D-28
Exhibit 6D-16 Eastern Europe HDPE Demand and Forecast by Modality .....	6D-30
Exhibit 6D-17 Eastern Europe MDPE Demand and Forecast.....	6D-30
Exhibit 6D-18 Eastern Europe HDPE Growth Drive Tree .....	6D-32
Exhibit 6D-19 Eastern Europe Bimodal HDPE Growth Driver Tree .....	6D-35
Exhibit 6D-20 Eastern Europe MDPE Growth Driver Tree .....	6D-35
Exhibit 6D-21 Eastern Europe HDPE Capacity -Historical .....	6D-37
Exhibit 6D-22 Eastern Europe HDPE Capacity by Supplier.....	6D-39
Exhibit 6D-23 Eastern Europe HDPE by Process.....	6D-41
Exhibit 6D-24 Eastern Europe HDPE Capacity by Modality .....	6D-42
Exhibit 6D-25 Eastern Europe HDPE Capacity by Technology .....	6D-43
Exhibit 6D-26 Eastern Europe HDPE by Supplier.....	6D-46
Exhibit 6D-27 Eastern Europe Bimodal HDPE by Supplier.....	6D-47
Exhibit 6D-28 Eastern Europe HDPE by Technology and Site .....	6D-48
Exhibit 6D-29 Eastern Europe Capacity Addition.....	6D-50
Exhibit 6D-30 Eastern Europe HDPE SWOT Analysis .....	6D-52

### CHAPTER 6E1: ASIA SUPPLY, DEMAND, AND TRADE ANALYSIS

Exhibit 6E1-1 Asian HDPE Supply, 2010 .....	6E1- 2
Exhibit 6E1-2 Asian HDPE Demand by Application, 2010.....	6E1-4
Exhibit 6E1-3 Asian HDPE Demand for by Region .....	6E1-5



## LIST OF EXHIBITS (CONT'D)

Exhibit 6E1-4 Asian HDPE Demand by Modality .....	6E1-6
Exhibit 6E1-5 Asian Bimodal HDPE Demand by Application .....	6E1-8
Exhibit 6E1-6 Asian Bimodal HDPE Demand by Region, 2010 .....	6E1-9
Exhibit 6E1-7 Asian MDPE Demand by Application 2010 .....	6E1-10
Exhibit 6E1-8 Asian MDPE Demand by Region, 2010 .....	6E1-12
Exhibit 6E1-9 Asian HDPE Operating Balance, 2010 .....	6E1-13

### CHAPTER 6E2: JAPAN HDPE MARKET ANALYSIS

Exhibit 6E2-1 Japan GDP .....	6E2- 2
Exhibit 6E2-2 Japan HDPE Demand .....	6E2- 4
Exhibit 6E2-3 Japan HDPE Historical Demand by Application .....	6E2-6
Exhibit 6E2-4 Japan HDPE Demand by Modality .....	6E2-7
Exhibit 6E2-5 Japan HDPE Demand by Application .....	6E2-8
Exhibit 6E2-6 Japan HMW HDPE Films Demand by Modality .....	6E2-10
Exhibit 6E2-7 Japan Blow Molding Resin Demand by Modality .....	6E2-11
Exhibit 6E2-8 Japan HDPE/MDPE Pipe Resin Demand .....	6E2-13
Exhibit 6E2-9 Japan HDPE Bimodal Demand .....	6E2-14
Exhibit 6E2-10 Japan MDPE Demand by Application .....	6E2-16
Exhibit 6E2-11 Japan GDP Forecast for 2010- 2020 .....	6E2-17
Exhibit 6E2-12 Japan Demand Forecast for HDPE, 2010- 2015 .....	6E2-18
Exhibit 6E2-13 Japan Demand Forecast for MDPE, 2010- 2015 .....	6E2-20
Exhibit 6E2-14 Japan HDPE Growth Driver Tree Analysis 2010-2015 .....	6E2-21
Exhibit 6E2-15 Japan HDPE Bimodal Growth Driver Tree Analysis 2010-2015 .....	6E2-24
Exhibit 6E2-16 Japan MDPE Growth Driver Tree Analysis 2010-2015 .....	6E2-24
Exhibit 6E2-17 Japan HDPE Capacity .....	6E2-25
Exhibit 6E2-18 Japan HDPE Capacity by Process Type .....	6E2-27
Exhibit 6E2-19 Japan HDPE Capacity by Modality .....	6E2-28
Exhibit 6E2-20 Japan HDPE Capacity by Technologies .....	6E2-29
Exhibit 6E2-21 Japan HDPE Capacity by Suppliers .....	6E2-31
Exhibit 6E2-22 Japan HDPE Producers, Technologies, and Production Site .....	6E2-32
Exhibit 6E2-23 Japan HDPE SWOT Analysis .....	6E2-34

### CHAPTER 6E3: CHINA HDPE MARKET ANALYSIS

Exhibit 6E3-1 China's GDP .....	6E3-2
Exhibit 6E3-2 China's HDPE Demand Historical .....	6E3-4
Exhibit 6E3-3 China's HDPE Historical Demand by Application .....	6E3-6
Exhibit 6E3-4 China's HDPE Demand by Modality .....	6E3-7
Exhibit 6E3-5 China's HDPE Demand by Application, 2010 .....	6E3-9
Exhibit 6E3-6 China's Blow Molding Demand by Modality .....	6E3-10
Exhibit 6E3-7 China's HDPE Film Demand by Modality .....	6E3-11
Exhibit 6E3-8 China's HDPE Pipe demand by Modality .....	6E3-12
Exhibit 6E3-9 China's Bimodal HDPE Demand by Application .....	6E3-14
Exhibit 6E3-10 China's MDPE Demand .....	6E3-16



## LIST OF EXHIBITS (CONT'D)

Exhibit 6E3-11 China's GDP Forecast 2010- 2020 .....	6E3-17
Exhibit 6E3-12 China's Demand and Forecast for HDPE by Modality .....	6E3-19
Exhibit 6E3-13 China's Demand and Forecast for MDPE .....	6E3-19
Exhibit 6E3-14 China's HDPE Growth Driver Tree, 2010-2015 .....	6E3-20
Exhibit 6E3-15 China's Bimodal HDPE Growth Driver Tree, 2010-2015 .....	6E3-23
Exhibit 6E3-16 China's MDPE Growth Driver Tree, 2010-2015.....	6E3-23
Exhibit 6E3-17 China's HDPE Capacity .....	6E3-25
Exhibit 6E3-18 China's HDPE Capacity by Process Type .....	6E3-26
Exhibit 6E3-19 China's HDPE Capacity by Modality .....	6E3-27
Exhibit 6E3-20 China's HDPE Capacity by Technology.....	6E3-29
Exhibit 6E3-21 China's HDPE Capacity by Producer.....	6E3-31
Exhibit 6E3-22 China's HDPE Capacity by Technology and Production Sites .....	6E3-32
Exhibit 6E3-23 China's HDPE Capacity Addition, 2010- 2015.....	6E3-34
Exhibit 6E3-24 SWOT Analysis of China's HDPE.....	6E3-35

### CHAPTER 6E4: INDIA HDPE MARKET ANALYSIS

Exhibit 6E4-1 India's GDP and Growth Rate.....	6E4- 2
Exhibit 6E4-2 India's Historical HDPE Demand .....	6E4- 4
Exhibit 6E4-3 India's Historical HDPE Demand by Application .....	6E4-5
Exhibit 6E4-4 India's HDPE Demand by Type and Modality .....	6E4-7
Exhibit 6E4-5 India's HDPE Demand by Application .....	6E4-8
Exhibit 6E4-6 India's HDPE Blow Molding Demand by Modality .....	6E4-10
Exhibit 6E4-7 India's HMW HDPE films Demand by Modality .....	6E4-12
Exhibit 6E4-8 India's HDPE Pipes Demand by Type and by Modality .....	6E4-14
Exhibit 6E4-9 India's Rotomolding Demand by Type .....	6E4-16
Exhibit 6E4-10 HDPE Demand by Sector .....	6E4-17
Exhibit 6E4-11 India's Bimodal HDPE Demand by Application .....	6E4-19
Exhibit 6E4-12 India's MDPE Demand .....	6E4-21
Exhibit 6E4-13 GDP Forecast 2010 – 2025 .....	6E4-22
Exhibit 6E4-14 HDPE Demand and Forecast by Modality .....	6E4-24
Exhibit 6E4-15 Demand and Forecast for MDPE.....	6E4-24
Exhibit 6E4-16 Growth Driver Tree Analysis 2010-2015.....	6E4-25
Exhibit 6E4-17 HDPE Bimodal Growth Driver Tree Analysis 2010-2015.....	6E4-27
Exhibit 6E4-18 Growth Driver Tree Analysis for MDPE 2010-2015 .....	6E4-27
Exhibit 6E4-19 India's HDPE Capacity .....	6E4-29
Exhibit 6E4-20 India's HDPE Capacity by Process Type .....	6E4-30
Exhibit 6E4-21 India's HDPE Capacity by Modality .....	6E4-31
Exhibit 6E4-22 India's HDPE Capacity by Technology .....	6E4-33
Exhibit 6E4-23 India's HDPE Capacity by Supplier.....	6E4-36
Exhibit 6E4-24 India's HDPE Capacity by Technology and Site.....	6E4-37
Exhibit 6E4-25 India's HDPE Capacity Additions, 2010-2015 .....	6E4-40
Exhibit 6E4-26 India's HDPE SWOT Analysis .....	6E4-41



## LIST OF EXHIBITS (CONT'D)

### CHAPTER 6E5: SOUTH KOREA HDPE MARKET ANALYSIS

Exhibit 6E5-1 S. Korea's GDP and Growth Rate - Historical .....	6E5- 2
Exhibit 6E5-2 S. Korea's Historical HDPE Demanda .....	6E5- 4
Exhibit 6E5-3 S. Korea's Historical HDPE Demand by Application .....	6E5-5
Exhibit 6E5-4 S. Korea's HDPE Demand by Type and Modality .....	6E5-7
Exhibit 6E5-5 S. Korea's HDPE Demand by Application .....	6E5-8
Exhibit 6E5-6 S. Korea's HDPE Film Demand by Modality.....	6E5-9
Exhibit 6E5-7 S. Korea's HDPE Blow Molding Demand by Modality .....	6E5-11
Exhibit 6E5-8 S. Korea's Pipes Demand by Type and by Modality .....	6E5-12
Exhibit 6E5-9 S. Korea's Bimodal HDPE Demand by Application .....	6E5-14
Exhibit 6E5-10 S. Korea's MDPE Demand by Application .....	6E5-15
Exhibit 6E5-11 S. Korea's GDP and GDP Growth Forecast .....	6E5-16
Exhibit 6E5-12 S. Korea's HDPE Demand and Forecast by Modality .....	6E5-18
Exhibit 6E5-13 S. Korea's MDPE Demand and Forecast .....	6E5-18
Exhibit 6E5-14 S. Korea's HDPE Growth Drive Tree .....	6E5-19
Exhibit 6E5-15 S. Korea's Bimodal HDPE Growth Drive Tree .....	6E5-22
Exhibit 6E5-16 S. Korea's MDPE Growth Driver Tree .....	6E5-22
Exhibit 6E5-17 S. Korea's HDPE Capacity- Historical .....	6E5-24
Exhibit 6E5-18 S. Korea's HDPE Capacity by Process.....	6E5-25
Exhibit 6E5-19 S. Korea's HDPE Capacity by Modality .....	6E5-26
Exhibit 6E5-20 S. Korea's HDPE Capacity by Supplier .....	6E5-28
Exhibit 6E5-21 S. Korea's HDPE Capacity by Technology .....	6E5-30
Exhibit 6E5-22 S. Korea's HDPE Producer by Technology and Site .....	6E5-31
Exhibit 6E5-23 S. Korea's HDPE Capacity Additions.....	6E5-33
Exhibit 6E5-24 S. Korea's HDPE SWOT Analysis .....	6E5-34

### CHAPTER 6E6: REST OF ASIA (ROA) HDPE MARKET ANALYSIS

Exhibit 6E6-1 ROA HDPE Demand - Historical.....	6E6- 3
Exhibit 6E6-2 ROA's Historical HDPE Demand by Application .....	6E6- 4
Exhibit 6E6-3 ROA's HDPE Demand by Country .....	6E6-6
Exhibit 6E6-4 ROA's HDPE Demand by Application .....	6E6-7
Exhibit 6E6-5 ROA's HDPE Growth Drive Tree .....	6E6-9
Exhibit 6E6-6 ROA's HDPE Capacity - Historical.....	6E6-11
Exhibit 6E6-7 ROA's HDPE Capacity by Country .....	6E6-12
Exhibit 6E6-8 ROA's HDPE Capacity by Supplier .....	6E6-14
Exhibit 6E6-9 ROA's HDPE Producers by Technology and Site .....	6E6-15
Exhibit 6E6-10 ROA's HDPE Capacity by Process .....	6E6-16
Exhibit 6E6-11 ROA's HDPE Capacity by Technology .....	6E6-18
Exhibit 6E6-12 ROA's HDPE Capacity Additions .....	6E6-20

### CHAPTER 6F: THE MIDDLE EAST AND AFRICA (MEA) HDPE MARKET ANALYSIS

Exhibit 6F-1 MEA's HDPE Demand by Application - Historical.....	6F-2
Exhibit 6F-2 MEA's HDPE Demand by Region .....	6F-4



## LIST OF EXHIBITS (CONT'D)

Exhibit 6F-3 MEA's Historical HDPE Demand by Application .....	6F-6
Exhibit 6F-4 MEA's HDPE Demand by Modality .....	6F-7
Exhibit 6F-5 MEA's Bimodal HDPE Demand by Application .....	6F-8
Exhibit 6F-6 MEA's Demand by Type (Density) .....	6F-10
Exhibit 6F-7 MEA's MDPE Demand by Application .....	6F-11
Exhibit 6F-8 MEA's HDPE Demand and forecast by modality .....	6F-13
Exhibit 6F-9 MEA's MDPE Demand and forecast .....	6F-13
Exhibit 6F-10 MEA's HDPE Growth Drive Tree .....	6F-15
Exhibit 6F-11 MEA's Bimodal HDPE Demand and Growth Driver Tree .....	6F-16
Exhibit 6F-12 MEA's MDPE Demand and Growth Driver Tree .....	6F-16
Exhibit 6F-13 MEA's HDPE Historical Capacity .....	6F-18
Exhibit 6F-14 MEA's HDPE Capacity by Region.....	6F-19
Exhibit 6F-15 MEA's HDPE Capacity by Country .....	6F-20
Exhibit 6F-16 MEA's MDPE Producers by Technology and site .....	6F-21
Exhibit 6F-17 MEA's HDPE Capacity Additions .....	6F-23
Exhibit 6F-18 MEA's HDPE Net Trade by Region.....	6F-26
Exhibit 6F-19 MEA's HDPE Export by Region .....	6F-27
Exhibit 6F-20 MEA's HDPE Export by Country .....	6F-28
Exhibit 6F-21 MEA's HDPE Supply/Demand Balance .....	6F-30

### CHAPTER 7: TECHNOLOGY ANALYSIS

Exhibit 7-1 Commercial HDPE Process Technologies .....	7-3
Exhibit 7-2 Capabilities of Different Low Pressure PE Processes .....	7-4
Exhibit 7-3 Schematic of Phillips Slurry Loop Process.....	7-5
Exhibit 7-4 Schematic of the INNOVENE S Slurry Loop Process.....	7-8
Exhibit 7-5 Schematic of HOSTALEN Process .....	7-11
Exhibit 7-6 Schematic of Mitsui CX Process .....	7-12
Exhibit 7-7 Schematic of BOSTAR PE Process .....	7-15
Exhibit 7-8 Schematic of Unipol PE Process .....	7-18
Exhibit 7-9 Schematic of Innovene G Process .....	7-20
Exhibit 7-10 Schematic of Spherilene C Process.....	7-21
Exhibit 7-11 Schematic of the Dowlex Solution Process.....	7-23
Exhibit 7-12 Schematic of Compact Solution Process .....	7-25
Exhibit 7-13 Schematic of the AST/Sclairtech Solution Process.....	7-27
Exhibit 7-14 Manufacturing Cost of HDPE Gas Phase Process.....	7-32
Exhibit 7-15 Manufacturing Cost of HDPE Slurry Loop Process.....	7-33
Exhibit 7-16 Manufacturing Cost of HDPE Bimodal CSTR Process .....	7-34
Exhibit 7-17 Manufacturing Cost of HDPE Solution Process.....	7-35

### CHAPTER 8: HDPE CATALYSTS

Exhibit 8-1 Classification of Polyolefin Catalysts .....	8-4
Exhibit 8-2 Chromium catalysts vs. Ziegler-Natta Catalysts.....	8-7
Exhibit 8-3 Activation of Chrome-on-Silica .....	8-10



## LIST OF EXHIBITS (CONT'D)

Exhibit 8-4 Cr/silica System-Effects of Support Technology Parameters on polymer processing, structure, and properties –General Qualitative Trend .....	8-11
Exhibit 8-5 Industry Structure of Chromium Catalysts .....	8-13
Exhibit 8-6 Grace' Chromium Catalysts .....	8-15
Exhibit 8-7 Competitive Assessment of Chrome catalyst Suppliers .....	8-18
Exhibit 8-8 The Cosse Mechanism for the Polymerization of Ethylene.....	8-21
Exhibit 8-9 Industry Structure of Z/N PE Catalysts .....	8-24
Exhibit 8-10 Univation's Z/N Catalysts .....	8-26
Exhibit 8-11 Grace's Z/N Catalysts .....	8-30
Exhibit 8-12 BASF's LYNX Z/N Catalysts .....	8-31
Exhibit 8-13 Sinopec's Z/N PE Catalysts .....	8-33
Exhibit 8-14 Major Suppliers of Z/N PE Catalysts .....	8-34
Exhibit 8-15 Competitive Assessment of Z/N PE Catalysts Suppliers .....	8-35

### CHAPTER 9: APPENDIX - POLYTHYELNE TECHNOLOGY LICENSEES

Exhibit 9-1 Gas Phase – Unipol ... ..	9-1
Exhibit 9-1 Gas Phase – Unipol (Continued) ... ..	9-2
Exhibit 9-1 Gas Phase – Unipol (Continued).....	9-3
Exhibit 9-2 Gas Phase – Innovene G .....	9-4
Exhibit 9-3 Gas Phase – Spherilene S .....	9-5
Exhibit 9-4 Gas Phase – Spherilene C dual reactor .....	9-5
Exhibit 9-5 Slurry Phase – Phillips Loop .....	9-6
Exhibit 9-6 Slurry Phase – Innovene S double loop .....	9-7
Exhibit 9-7 Slurry Phase- CX CSTR dual reactors .....	9-8
Exhibit 9-8 Slurry Phase –Hostalen CSTR multi-reactors.....	9-9
Exhibit 9-9 Solution Phase –Sclairtech .....	9-10

