

# Market Study: Polyethylene - LLDPE



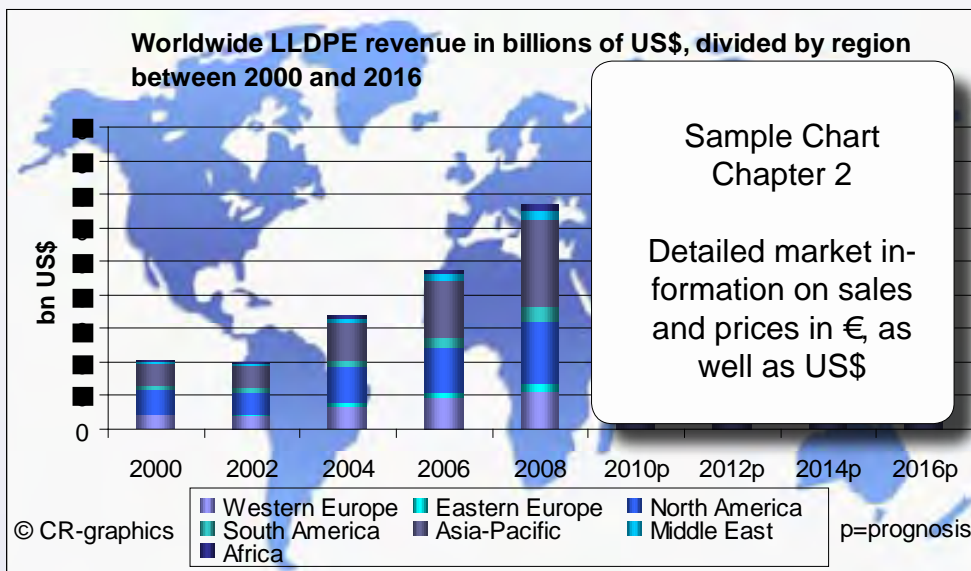
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**Ceresana  
Research**

# Market Study: Polyethylene - LLDPE

The newest study from Ceresana Research covers the plastic grade LLDPE (linear low density polyethylene). Due to its exceptional technical characteristics, LLDPE covers nearly all traditional markets for polyethylene. LLDPE is primarily used in the production of films. Product applications in this sector range from agricultural films, saran wrap, and bubble wrap, to multi-layer and composite films.

After LLDPE revenue in certain world regions fell by 20 to 30% in 2009, to a combined total of less than 17 billion € (24 billion US-\$), we expect to see substantial growth again starting in 2010. The Asia-Pacific region will continue to be the largest market and increase its share of global consumption to more than 50%. Industry in China will be the driving force of the LLDPE market. Even if past growth rates are not expected to be regained quickly, we anticipate dynamic development in the processing and production of LLDPE: Alone in China capacity increases of roughly 2.7 million tons are planned by 2012. In the Middle East, LLDPE production is expected to grow at a rate of more than 9% per year. In contrast, Western Europe and North America are not likely to regain their peak production levels from 2008 by 2016.



## In brief

- The multi-client study concisely presents the most important information on the different types of LLDPE, their advantages, and application possibilities, as well as legal situations, certifications, disposal and recycling.
- Data on the LLDPE market is prepared quantitatively with regard to consumption, the most important application areas and markets – including prognoses up to 2016. Revenue and prices are each given in € and US\$ values.
- LLDPE consumption, divided by application area, is examined in detail for the world and 7 world regions – and additionally for the 12 countries with the highest revenue.
- Valuable data on production and capacities, as well as imports and exports is provided for 67 countries.
- This useful reference work offers 80 profiles for current and future manufacturers, with information on each product portfolio, as well as current and future capacities.
- The company profiles are structured according to contact information, product ranges, and corporate integration.
- Some of the 80 manufacturers include, among others: Borealis, Braskem, ExxonMobil Chemical Company, Formosa Plastics Corp (FPC), GAIL (India) Limited, INEOS Group, LyondellBasell Industries, Mitsubishi Chemical Corporation, National Petrochemical Company, PetroChina, Reliance Industries, SABIC, Sinopec, The Dow Chemical Company.

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#### 1 Basics

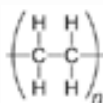
##### 1.1 Background and Chemistry

Outline of this Section:

- Definition of polyethylene grades
- Brief History

**Polyethylene** or **Polyethene (PE)** is a milky, thermoplastic polymer. It is the most commonly used plastic and is primarily used in consumer goods like plastic bottles and containers. The Union of Pure and Applied Chemistry Nomenclature (IUPAC) Number **9002-88-4**. PE is a polyolefin or a saturated hydrocarbon. It is formed in a catalytic process through the polymerization of ethene. Specifically, it is a combination of ethene homopolymer and other small proportions of olefinic comonomers.

The simplified chain structural formula of the primary chain is:



This thermoplastic material is composed of carbon and hydrogen atoms joined together by the formation of high molecular weight products. Methane gas is converted into ethylene, then into polyethylene following the application of heat and pressure. The longer the primary chain, the greater the number of atoms, and consequently, the greater the molecular weight will be. The molecular weight, the molecular weight distribution and the amount of branching determine many of the mechanical and chemical properties of the end product.

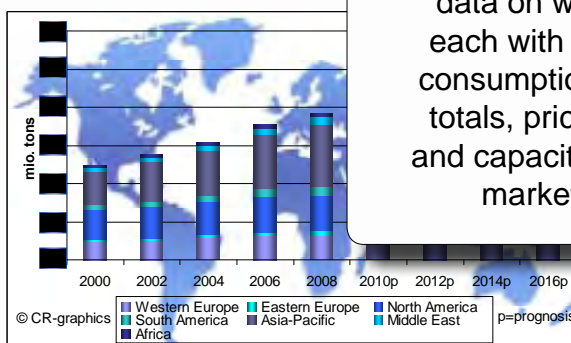
The extent of branching determines the degree of crystallinity, which in turn affects density and other properties. Polyethylenes are thus usually classified according to

Vol. I / Chapter 1

All important, fundamental information regarding LLDPE – compiled overview

#### 2 Market Data – World

Worldwide consumption of LLDPE totalled X million tons in the year 2000. Demand reached approximately X million tons in 2008, following a steady increase over the year (Graph). The processing industry in the Asia-Pacific market in 2008, accounting for more than X% of the total demand. North America (X%), and Western Europe (X%). We expect an average annual rate of X% starting in 2008, and reaching X% by the year 2016.



Graph: Worldwide LLDPE consumption divided by region from 2000 until 2016

Market share in the Asian Pacific is anticipated to increase an additional X percentage points by 2016, whereas North American LLDPE processors will see a drop of X percentage points in the global market. Market share in Western Europe's processing industry is expected to fall by X percentage points.

Vol. I / Chapter 2

Comprehensive market data on world regions – each with information on consumption and revenue totals, prices, production and capacities, trends, and market dynamics

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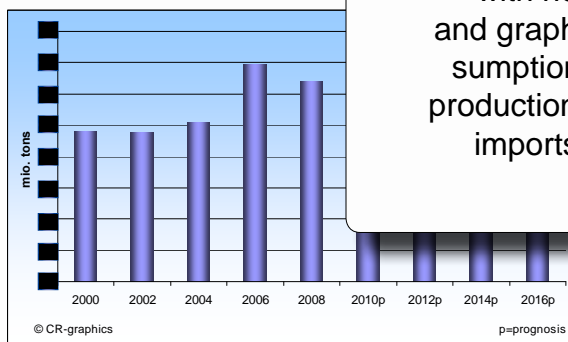
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**3.1.6.2 Production and Capacities in Germany**

XX million tons of LLDPE were manufactured in Germany during the year 2000 (Graph). The largest production amount as of yet took place in 2006, with just less than XX million tons. LLDPE manufacturers in Germany achieved the highest production in West European production in 2008, with a volume of XX million tons. We expect Germany to produce XX million tons in 2010, which is likely to fall to XX million tons by 2016. While an average of XX million tons was achieved from 2000 to 2008, a decrease of XX million tons is expected between 2008 and 2016.



Graph: Production of LLDPE in Germany from 2000 until 2016

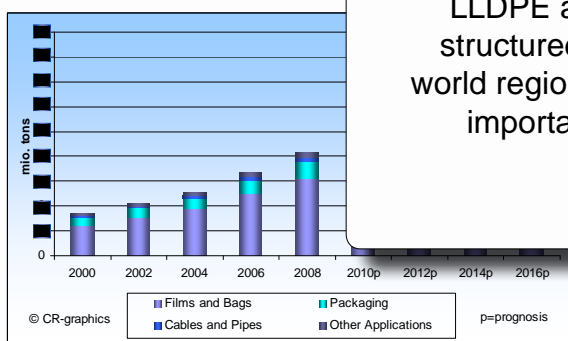
Company	Capacity without Swing Plants	Capacity of Swing Plants
SABIC	XX.000	XX.000
INEOS Group	XX.000	XX.000
Dow Chemical	XX.000	XX.000

Vol. I / Chapter 3

Detailed country analyses – with numerous tables and graphs covering consumption and revenue, production and capacities, imports and exports

**4.9.1 Country Profiles – Applications: China**

China's processing industry is the world's largest consumer of LLDPE, with more than X million tons consumed in 2008. The most important application, at X%, is made up of film and bag manufacturers, followed by packaging, which has a share of LLDPE demand. X% was used for the other applications, such as coatings, toys, and other goods had a share of X%.



Graph: Demand of LLDPE in China from 2008 until 2016, divided by application

While manufacturers of LLDPE products have profited considerably from exports in the past, the importance of domestic demand will increase considerably in the future. Processors in China have been impacted by foreign trade, through falling demand in the United States and Europe, resulting in lower production numbers and a rise in stock holding. However, only a portion of LLDPE processors were affected by this. While for example, the production of industrial films achieved relatively small growth, the volume of food packaging films increased substantially. The processing industry profited here from growing demand in retail, as well as

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Concise market data for LLDPE applications – structured according to world regions and the most important countries

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**5.5.3 India**

GAIL (India) Limited	
16 Bhikaji Cama Place	
New Delhi 110 066	
India	
Tel.	91 11 26172580
Fax	91 11 26185941
Web	www.gailonline.com
E-mail	n.a.
Foundation	1984
Staff	3,480 (2008)
Turnover 08	INR XX billion (gross sales:
Turnover 07	INR XX billion (gross sales:
Turnover 06	INR XX billion (gross sales: fiscal year ended March 06)
Earnings 08	INR XX billion (profit after tax: fiscal year ended March 08)
Earnings 07	INR XX billion (profit after tax: fiscal year ended March 07)
Earnings 06	INR XX billion (profit after tax: fiscal year ended March 06)
Divisions, Product range	The company is divided into 3 business units: <ul style="list-style-type: none"> <li>• Natural gas</li> <li>• LPG and other liquid hydrocarbons</li> <li>• Petrochemicals</li> </ul> Ethylene, propylene, butane, HDPE, LLDPE, LDPE (future product), EVA (future product)
The company is also active as a provider of natural gas-based	

Vol. II / Chapter 5

Extensive company profiles for 80 manufacturers – with sales and earnings figures, product ranges, production facilities, cooperations, and new developments

Site / Plant (current)	Capacity (tons / year)	Start-Up
Pata, Auraiya, India	XX,000 (swing plant) (HDPE/LLDPE)	
Total capacity (currently)	XX,000	
Site / Plant (planned)	Capacity (tons / year)	
Pata, Auraiya, India	XX,000 + XX,000 (HDPE/LLDPE)	
Kochi, Kerala, India	XX,000 (swing plant) (HDPE/LLDPE)	
Lapetkata, Assam, India (JV Brahmaputra Cracker and Polymer Limited)	XX,000 (swing plant) (HDPE/LLDPE) [XX% of XX,000]	
Total Capacity (2011)	XX,000	
Type: LLDPE/ Application		Trade Name/Grade
Ind., milk and misc. packaging, general purpose, lamination		G-Lenell F20S009
Lamination film, cling film		G-Lenell E20AN009
Extrusion coating on HDPE fabric		G-Lenell E36A060
Water storage tanks, chemical tanks, bins, industrial components, toys		G-Lenell R35A042
Non black water tanks, road dividers, outdoor toys		G-Lenell R35U042

Vol. II / Chapter 5

List of current LLDPE production facilities – and prognoses regarding future capacities

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- Be informed about research and technology trends
- Be duly informed of take-overs and innovations
- Use reliable information (e.g. prices, turnover, volumes) for a successful business plan
- Learn about the most important product lines and application fields with their single consumption quantities
- Gain a detailed description of LLDPE: performance, usage and requirements
- Analyze technical and toxicological product characteristics
- Be up to date with the most important manufacturers through a multitude of company profiles

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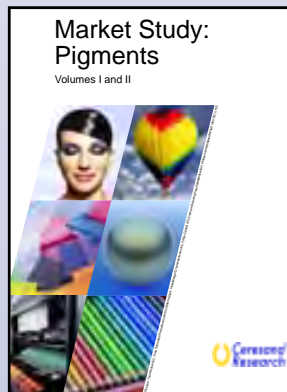
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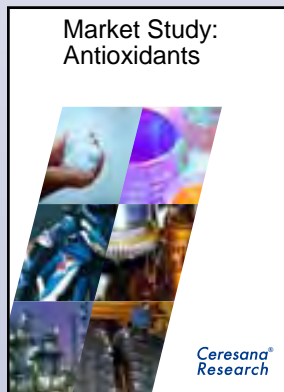
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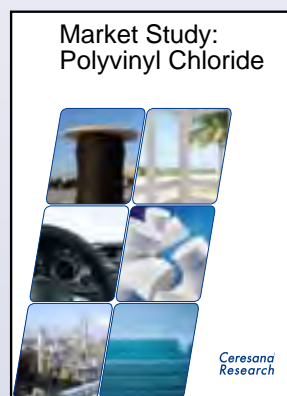
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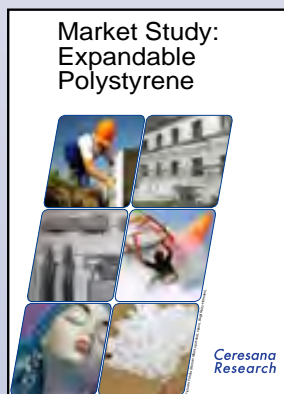


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