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PURVIN
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WORLD LPG MARKET OUTLOOK



AN ONLINE MULTICLIENT SERVICE



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ABOUT PURVIN & GERTZ

Founded in 1947, Purvin & Gertz is an independent consulting firm providing technical, commercial and strategic advice concerning the oil, gas, chemical, and power generation industries.

We specialize in serving clients involved in the production, processing, transportation and marketing of crude oil, petroleum products, natural gas and LPG. We have been very actively involved in international LPG industry for over 30 years.

We provide assistance to a wide range of clients across the globe that are involved in the LPG business and/or other energy markets. Much of our work involves single-client assignments, which are customized to clients' specific situation and requirements. We also provide several in-depth multiclient services to keep clients informed about the latest developments in the LPG industry and prospects for the future. Purvin & Gertz organizes and hosts three annual LPG seminars (U.S./International, Asia, and Latin America), which are excellent forums for industry participants to conduct business, develop contacts, and exchange ideas.

The firm consists primarily of chemical engineers with extensive experience in analyzing the technical, commercial, and economic inter-relationships in the industries we serve. This is very important in the case of LPG since it is often significantly impacted by changes in oil and gas production as well as the refining and petrochemical industries.

We are an employee-owned firm, operating independently of any holding company, engineering/construction firm or process licensor. Our objective expertise has proven its worth in the success of many of the leading companies in the world.

Headquartered in Houston, Purvin & Gertz maintains an international network of offices in the U.S., Canada, Europe, and Asia to serve clients worldwide.

Visit us on our website at www.purvingertz.com

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INTRODUCTION

The international LPG industry has expanded rapidly over the past decade and undergone many profound changes. New markets for LPG have emerged in many locations, and LPG consumption is increasing in virtually every region of the world. Utilization of LPG as fuel in residential and commercial markets is rising particularly fast in many developing countries as access to LPG is expanded and markets are liberalized. These market developments are creating investment opportunities in many segments of the LPG industry—including terminaling, storage, distribution, and marketing.

The prospects for the international LPG industry continue to appear promising. Markets for LPG in developing countries should continue to expand as more and more customers are introduced to LPG and infrastructure is added to efficiently distribute and market the product. While LPG consumption has already grown quickly in several emerging markets, per capita LPG consumption in most developing regions remains substantially below consumption patterns in well-established markets such as Japan, North America, and Western Europe. Thus, significant growth potential remains in most regions of the world.

This study provides an in-depth analysis of the world and regional LPG markets.

The petrochemical industry has significantly expanded over the past decade, greatly increasing the need for feedstocks. As a result, the base demand for LPG feedstocks (in plants specifically designed for LPG and/or ethane) has grown rapidly and the ability of flexible petrochemical plants to absorb LPG supplies available for price-sensitive markets has steadily risen. The petrochemical industry is having a particularly important influence on LPG markets in North America, Western Europe, and the Middle East. The petrochemical market is expected to remain a strong growth market for LPG (and other feedstocks such as naphtha and ethane) over the medium to long-term as global petrochemical demand growth continues to outpace energy demand growth.

As discussed above, the prospects for continued expansion of the LPG industry into new and traditional markets, appear reasonably strong. However, there are many uncertainties that will influence the future development of the global LPG market as well as regional markets. Examples of these uncertainties include development of new LPG supply projects, fluctuations in LPG exports availabilities from traditional supply sources, changes in government/regulatory policies, and development of new markets for LPG. New LPG-based petrochemical plants, shifting trade patterns, changing LPG price levels, and the impact of price shifts on demand growth in developing countries will continue to impact future developments in the global LPG market.

ANNUAL WORLD LPG MARKET ANALYSIS

The LPG industry, like most other global industries, is changing at an increasing rapid rate. As a result, there is a clear need for a current in-depth analysis of the world and regional LPG markets to keep industry participants informed about the latest trends in the industry and provide an up-to-date independent outlook for future market conditions. To meet this need, Purvin & Gertz is now offering a comprehensive in-depth analysis of the international LPG industry that will be updated and re-issued each year.

Over the past 30 years, Purvin & Gertz has conducted multiclient studies covering worldwide and regional issues related to the LPG industry. Typically, we have performed a major worldwide study every three years. These studies forecast LPG supply by source and location, LPG by end-use application, global/regional trade and LPG pricing.

Our clients have always appreciated the great depth of our analysis and our rigorous approach in supply, demand, and pricing. However, the three-year schedule for publication of the study causes the information to be out of date before the next study is available. A number of clients have expressed strong interest in services that provide more timely, up-to-date information. The World LPG Market Outlook now offered by Purvin & Gertz will meet this ongoing need of our clients by providing an annually-updated comprehensive analysis of world LPG markets.

STUDY AVAILABILITY/ONLINE ACCESS

The annual World LPG Market Outlook report is available to clients in three delivery modes: printed report, CD-ROM format, and electronic access via the Internet. Three copies of the annual report are provided to each subscribing company as part of the basic subscription price in either the printed report or CD-ROM format. Additional copies of either the printed report or CD-ROM can be obtained at an additional cost (see enclosed Subscription Agreement for more details).

**The complete World
LPG Market Outlook is
accessible around the
globe via the Internet.**

The complete study is available online. The text is provided in HTML and Adobe Acrobat® (PDF) format. Numerical data/forecasts in Excel® spreadsheets is downloadable for ease of use. Online availability has a number of advantages over the traditional printed report delivery system, including:

- The information is readily accessible by any number of personnel at any location at any time for employees of the subscribing company.
- The information of interest can be isolated from the large body of other information quickly and easily.
- The information is accessible as soon as it is put online with no delay due to printing and shipping.

ONGOING SUPPORT

Our staff is available to answer questions and give clients general assistance on using the study and its contents. We will also make an annual presentation of our outlook of the global LPG industry in our Houston or London office at no additional charge. In other locations, presentations will be made for a cost based on additional consulting time and expenses.

The Purvin & Gertz' staff is available to answer questions and assist in the use of the study.

OTHER MARKET ANALYSIS SERVICES

In addition to our long-term studies, we publish a short-term LPG market analysis service containing monthly analysis and forecasts with a time horizon of eighteen months to two years. This service is also available via Internet delivery. Please contact us for more details about our short-term LPG market analysis service.

SCOPE AND METHODOLOGY

The study addresses the key issues facing the international and regional LPG industries. Purvin & Gertz analyzes the future supply/demand situation for the international LPG industry within a framework of world energy/economic activity. The prospects for future world market developments are examined, and the likely impact on LPG trade and pricing are assessed.

The study includes detailed market analysis of over 50 major country markets.

In preparing this study, Purvin & Gertz visits the major LPG producing and consuming countries of the world. Discussions are held with producers, marketers, consumers, traders, distribution/terminal/shipping companies, as well as various government agencies.

The regional supply/demand analysis to 2025 forms the basis for assessing the future outlook for the international LPG industry. On the demand side, the prospects for growth in the different end-use markets are projected given the forecast of economic activity and any physical, regulatory or commercial marketing constraint. Supply projections are developed from forecasts of LPG production from existing sources and announced or anticipated new supply projects. The world is divided into the following geographic regions.

- North America
- Western Europe
- Eastern Europe
- Former Soviet Union
- Far East
- Southeast Asia
- Indian Subcontinent
- Oceania
- Latin America
- Africa
- Middle East

Total LPG supplies are compared with projected levels of base demand, which includes all premium/captive end-uses of LPG that are relatively insensitive to moderate changes in LPG prices. The amount that total LPG supplies exceed base demand in any period is called the “base surplus” and represents the quantity of LPG available for price-sensitive market development. Price-sensitive LPG consumption is projected for each country/region based on the global LPG base surplus, regional supply/demand factors, and feedstock/interfuel economics.

Supply and demand projections are developed and presented in the study for each of the 11 regions listed above and the major country markets within each region. Included in the study are detailed supply and demand projections for over 50 major country markets.

Projections of LPG pricing are developed for the major producing and consuming regions of the world. These projections are consistent with expected future trade patterns and the outlook for international crude oil and refined products pricing.

WORLD LPG MARKETS

The study includes a global analysis of LPG supply and demand consistent with the outlook for world/regional economic activity and energy demand. The outlook for future international LPG supplies is developed both on a source (natural gas, refineries) and a regional basis. Key LPG supply developments and new projects are examined in both a regional and global context. The prospects for development of additional export oriented projects in the Former Soviet Union, Africa, Asia/Pacific, Latin America, and the Middle East are also assessed.

Key LPG market developments and new projects are examined in both a regional and global context.

The prospect for demand growth in each end-use category is examined and contrasted by region. There are significant regional variations in the growth patterns in each end-use sector for LPG throughout the world. The key market factors contributing to the variations are analyzed and the outlook for future demand growth in each market sector is presented.

The projection of total world supplies is compared to the projection of base demand to determine the quantity of LPG available for price-sensitive market development. The difference between total LPG supplies and base demand is referred to as a “base surplus” in the analysis. Future base surplus LPG volumes are allocated to the various price-sensitive markets (primarily petrochemical feedstocks) in different regions of the world after considering competitive economics, the capacity of each region to consume price-sensitive LPG supplies, and other regional supply/demand factors.

REGIONAL LPG MARKETS

An in-depth analysis of the LPG market in each of the 11 regions of the world and over 50 major producing and consuming countries is included in the study. This forms the basis for projecting future trade patterns and inter-regional LPG price relationships.

The outlook for LPG supply in each major producing country is developed based upon the expected level of crude oil production (LPG from associated gas), natural gas production (LPG from non-associated gas), and refinery production. LPG is typically produced as a by-product of oil and gas production and refining. Thus, LPG supplies are very dependent on changes in each of these activities. The supply projections included in this study also consider the operating/commercial constraints of existing facilities and capacities/start-up dates for new facilities under construction or in planning.

The LPG supply outlook is based on expected production levels of crude oil, natural gas and refining in each major producing country.

On the demand side, projections are made for LPG consumption by end-use for each major consuming country in the world. This includes an assessment of LPG demand in the following end-

use sectors: residential/commercial, industrial, engine fuel, town gas, refining, and chemical. Price-sensitive demand for LPG is also developed and presented for each country that is expected to participate in the clearing of global supplies available for this market sector.

The commercial structure and regulatory framework governing the utilization of LPG is analyzed in the major producing and consuming countries of the world. This review includes an assessment of the primary LPG distribution and marketing network that exists in each market and the current pricing environment.

REGIONAL COMPETITIVE ANALYSIS

The LPG industry has several different commercial elements that need to maintain an adequate level of profitability in order for markets to continue to expand. If profitability levels in any segment of the industry get too low, investors will be reluctant to commit additional capital and facilities to produce, store, transport, distribute, and market LPG. Were this to occur, bottlenecks in the commercial chain from producers to end-users would likely develop and could significantly alter future demand growth patterns. If, on the other hand, profit margins are too high, end-user prices could escalate to levels that would dampen demand in some end-uses and could discourage potential new end-users from selecting LPG as a fuel or feedstock.

In this study, a comparison of the profitability of the various segments of the LPG industry is assessed on a regional basis for key countries. From a supply standpoint, gross production margins for LPG produced from gas processing are determined from a consideration of projected FOB sales values for LPG and residue gas values. Specific production margins analyzed include North America, Middle East, and Western Europe (North Sea).

Profitability of various segments of the LPG industry is compared on regional basis for key countries.

On the marketing side, end-user prices and gross marketing margins are analyzed for the residential and commercial sector in several key consuming markets. Included in this analysis are countries in North America, Western Europe, and the Far East.

LPG TRADE

Historical and projected trade matrices are developed and presented in the study for LPG movements from the major producing areas to the major consuming areas. This analysis is very important to the overall results of the study since it highlights any anticipated shifts in world trade patterns that will occur and provides a basis to project utilization levels of the LPG shipping fleet and the need for new capacity additions.

Over the past several years, the international LPG industry has seen a gradual shift in world trade patterns. Demand in the East of Suez market has risen faster than LPG supplies in the region. This has reduced the need for Middle Eastern LPG producers to move LPG into Western markets and put upward pressure on Middle Eastern and Asian LPG prices. The LPG trade analysis in this study addresses the potential for continuation of this trend and the likely ramification on Asian markets and prices. This study also addresses the evolving trade patterns in the Atlantic Basin and the impact of anticipated trade shifts on regional pricing in Europe and the Americas.

Demand in the East of Suez market has risen faster than LPG supplies in the region.

LPG SHIPPING/TERMINALING

An analysis of the LPG shipping and terminaling is required to define any constraint which might affect the international movement of projected LPG supplies. Estimates of freight rates for the major current and projected trades are developed in this study. The forecast of freight rates are developed consistent with the expected future trading patterns and the costs/availability of necessary shipping capacity. The storage capacity of major terminals is reviewed for the key importing and exporting regions.

PRICING

Since LPG competes with refined products in many market sectors, forecasts of wholesale refined product prices are the starting point for determining competitive LPG prices. In this study, the overall level of crude oil prices are forecast based on the outlook for world/regional economic activity and energy demand. Crude oil prices are presented for marker crude oils (i.e. Dubai, WTI, LLS, Brent) in key international petroleum markets. Regional refined products prices are also presented for the U.S. Gulf Coast, Northwest Europe, Middle East, and Asia.

LPG pricing forecasts are developed consistent with the Purvin & Gertz crude oil and refined products market analysis service.

Purvin & Gertz performs an ongoing market analysis service for crude oil and refined products to clients in major world markets. As part of this ongoing analysis, a number of analytical techniques have been developed for relating supply/demand factors and refining economics to relationships between crude oil and refined products pricing.

International LPG market prices are a function of expected crude oil pricing, competitive economics in major markets, and global/regional supply/demand pressures. The outlook for regional LPG prices is developed consistent with projected freight rates, terminaling costs and various inland costs, duties, and taxes.

Pricing forecasts are prepared for the major exporting regions of the world. Regional LPG price forecasts are also developed and presented for the major consuming regions. The regional LPG price forecasts presented in this study include the following:

PRODUCING REGIONS

Middle East
North Sea
Algeria

CONSUMING REGIONS

United States
Northwest Europe
Mediterranean
Japan

The methodology utilized in developing these forecasts is presented and explained in the study.

WORLD ENERGY/ECONOMIC OUTLOOK

As a framework for analysis of future LPG supply and demand, the study includes projections of long-term regional and world energy/economic growth. The world energy outlook is developed from a consideration of possible energy supplies worldwide—both oil and non-oil. The evolution of oil prices and overall economic growth are forecast in conjunction with the energy supply outlook and likely trends in economic activity.

Energy use and economic activity on a regional basis is forecast consistent with the worldwide outlook. The regional energy supply/demand balances are constructed by comparing energy demand with the availability of various energy supplies, taking into account political constraints on production and trade. The forecast of regional LPG demand has been linked with the outlook for economic growth.

STUDY OUTLINE

INTRODUCTION

SUMMARY AND CONCLUSIONS

WORLD LPG MARKETS

- Supply
- Base Demand
 - Residential & Commercial
 - Industrial
 - Engine Fuel
 - Chemical
 - Town Gas
 - Refinery
- Price-Sensitive Demand
- Supply/Demand Balance

REGIONAL COMPETITIVE ANALYSIS

- Producer Margins
 - North America
 - Middle East
 - Western Europe
- Transportation
- Marketing
 - North America
 - Far East
 - Western Europe

LPG TRADE

- World Overview
- Analysis by Exporting Region
- Analysis by Importing Region

LPG SHIPPING/TERMINALING

- Overview
- World Fleet Status
- Fleet Utilization
- Shipping Demand
- Freight Rate Analysis
- Terminals

WORLD ENERGY/ECONOMIC OUTLOOK

PRICING

- Crude Oil
- Refined Products
- LPG
 - Middle East
 - United States
 - Northwest Europe
 - Japan
 - Algeria
 - Mediterranean
 - North Sea

REGIONAL LPG MARKETS

- North America
 - United States
 - Canada
- Western Europe
 - Austria
 - Belgium/Luxembourg
 - France
 - Germany
 - Greece

- Italy
- Netherlands
- Portugal
- Scandinavia
- Spain
- Switzerland
- Turkey
- UK/Ireland
- North Sea
- Eastern Europe
 - Bulgaria
 - Czech Republic
 - Hungary
 - Poland
 - Romania
 - Slovakia
 - Former Yugoslavia
- Former Soviet Union
- Far East
 - China
 - Japan
 - Korea
 - Taiwan
 - Other Far East
- Southeast Asia
 - Indonesia
 - Malaysia
 - Philippines
 - Singapore
 - Thailand
 - Vietnam
 - Other Southeast Asia
- Indian Subcontinent
 - India
 - Pakistan
 - Other Indian Subcontinent
- Oceania
 - Australia
 - New Zealand
 - Other Oceania
- Latin America
 - Argentina
 - Brazil
 - Chile
 - Colombia
 - Ecuador
 - Peru
 - Venezuela
 - Mexico
 - Other South America
 - Central America
 - Caribbean
- Africa
 - Algeria
 - Egypt
 - Morocco
 - Nigeria
 - Other Africa
- Middle East
 - Iran
 - Iraq
 - Kuwait
 - Qatar
 - Saudi Arabia
 - United Arab Emirates
 - Other Middle East

AVAILABILITY AND TERMS

The World LPG Market Outlook service is available to clients on an annual subscription basis. Each subscriber is entitled to receive three (2) printed copies of the report. The subscriber may elect to receive one or more of these copies in CD-ROM format in lieu of printed copies. Additional copies are available at an additional cost (see enclosed Subscription Agreement for more details). Each subscriber is entitled to an annual review of the study in our Houston or London office. Review presentations at other locations are available based on additional consulting time and expenses involved.

The subscription includes unlimited online access to the report and forecasts by employees of a client company via a secure Internet-based delivery system or through electronic transmissions of the report.

The subscription price for this service is detailed in the Subscription Agreement and is due upon invoicing. A subscription form is enclosed at the back of this brochure.

The service, report, and forecasts are strictly for the exclusive use of the purchasing company and its subsidiaries (100% or more ownership) or for the purchasing company and its parent company if the parent company owns 100% or more of the purchasing company.

This service, report, and forecasts are prepared for the sole benefit of the subscriber. Neither the report or forecasts shall be provided to third-parties without the written consent of Purvin & Gertz. Any third-party in possession of the report may not rely upon its conclusions without written consent from Purvin & Gertz. Possession of the report does not carry with it the right of publication.

Purvin & Gertz conducts this analysis and prepares this report utilizing reasonable care and skill in applying methods of analysis consistent with normal industry practice. All results are based on information available at the time of review. Changes in factors upon which the review is based could affect the results. There is not implied warranty of merchantability or fitness for a particular purpose.

THE COMPANY

Purvin & Gertz has been acquired by IHS Inc. -- the leading provider of critical information and insight in critical areas that shape today's business landscape. Please see the recent news section of this website for more information.

Purvin & Gertz, Inc. was founded in 1947 by Robert Purvin and Bud Gertz in Dallas. The firm evolved into a globally recognized independent energy consultancy with headquarters in Houston, Texas and an international network of offices in the United States, Canada, Europe, the Middle East, Russia and Asia.

Purvin & Gertz provides technical, commercial and strategic advice to international clients in the crude oil, petroleum refining, natural gas, natural gas liquids, petrochemical and power generation industries. Our consultants are highly educated seasoned industry professionals averaging over 20 years of individual experience in the technical, operational and commercial areas of the industries they serve. PurvinGertz.com is a favorite industry web portal for energy executives around the globe. In the fast-paced energy world, executives require immediate access to online sources of key market information, in-depth analysis and forecasts for supply, demand and pricing of energy products. Purvin & Gertz is pleased to offer subscribers a secure, password-protected customer portal to peruse electronic versions of our industry studies and market publications.

Purvin & Gertz has served a broad spectrum of clients over its 60-plus year existence. Most client relationships have involved a number of individual projects over the years. We have worked extensively in the energy and petrochemical industries, and have analyzed many facets of the businesses, including:

- Regional and Worldwide Supply/Demand/Pricing
- Sales/Supply Contract Analysis, Purchase Strategy
- Evaluation of Companies/Facilities for Acquisition or Financing
- Plant Operations/Investments
- Marketing
- Project Feasibility Analysis
- Company/Industry Strategic Assessments

In addition to performing single-client assignments, Purvin & Gertz undertakes numerous multiclient studies and subscription-based services. These in-depth analyses of broad-ranging topics provide insight into the key parameters affecting markets, develop comprehensive methodologies for forecasting supply/demand and pricing, and keep our extensive databases up-to-date. Purvin & Gertz also provides several short-term multiclient services in the form of monthly reports which are available online via the Internet. These monthly reports focus on short-term LPG and crude oil/refined products supply/demand and pricing trends.

Examples of multiclient services/studies offered by Purvin & Gertz are discussed below. For additional information about these services and Purvin & Gertz, please visit our web site at <http://www.purvingertz.com>

The North American NGL Industry – Risks and Rewards in the Midstream Sector.

This study assessed the future outlook for the natural gas liquids industry in the United States and Canada. Regional projections of ethane, propane, butane, and natural gasoline supply, demand, and pricing are presented through 2025. Also included in the study is a regional outlook of natural gas supply, demand, and pricing and an evaluation of gas processing across the region.

Global Petroleum Market Outlook (Continuous). This is an annual service providing analysis of long-term trends and developments in crude oil and refined products markets. The study provides an in-depth analysis of global and regional crude oil and refinery products supply, demand, and pricing. It contains a comprehensive analysis of the refining industry and an outlook for refining margins for the major refining centers of the world.



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Purvin & Gertz is an independent consulting firm providing advice to operating companies, financial institutions and government organizations.

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