

**NORTH AMERICAN
ANTIFREEZE RECYCLING MARKETS:
AN INDUSTRY ANALYSIS**

**MARKETS, TECHNOLOGIES &
TRENDS**

BASELINE STUDY

Prospectus for a Multiclient Study
Completed January, 1994 & 2000



Chemical Market Resources, Inc.

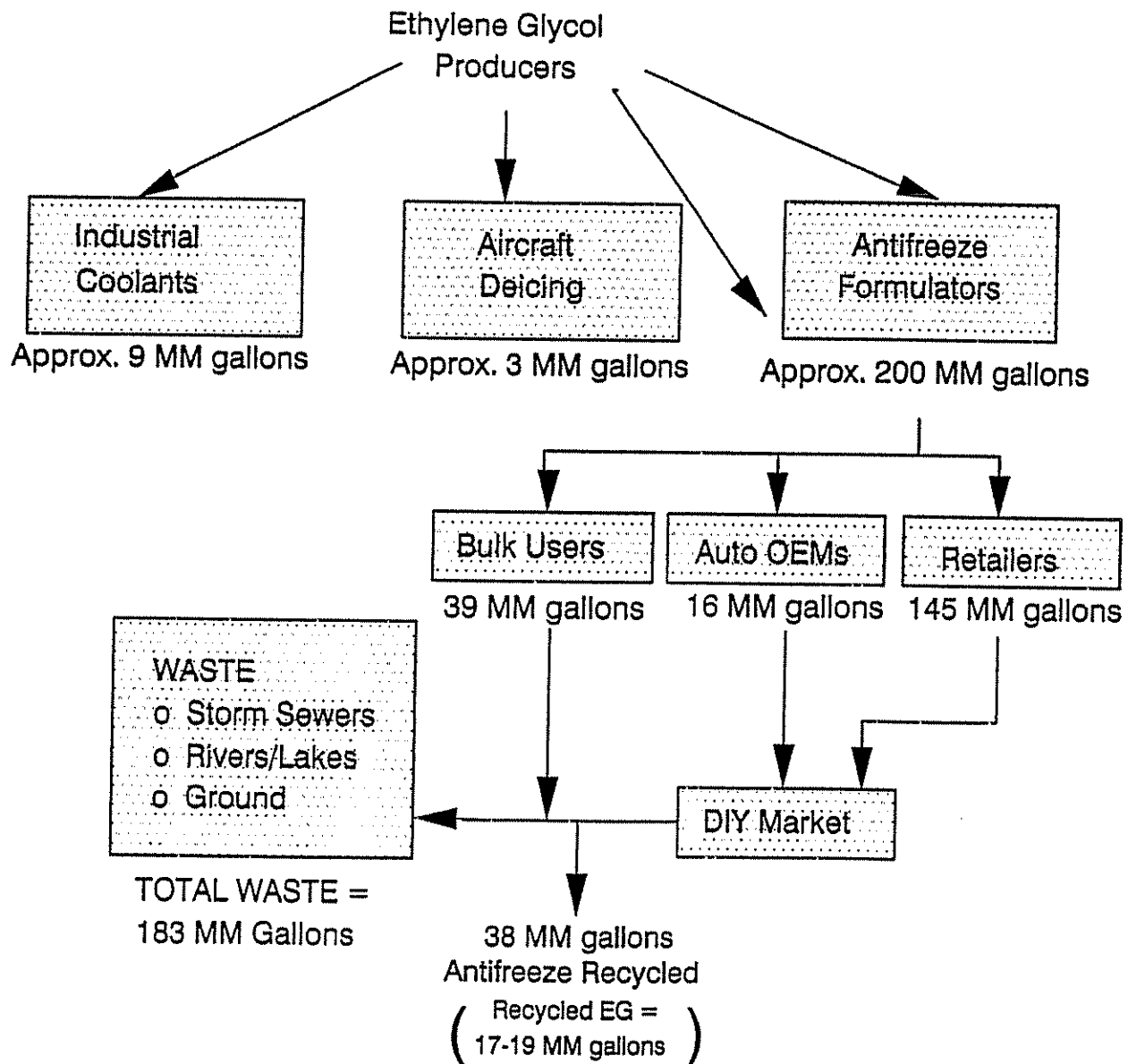
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Antifreeze Use/Recycle/Disposal Cycle 1993



SOURCE: CMR based on Industry Analysis



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BACKGROUND

Approximately 400 million gallons of spent antifreeze (50:50 solution) are generated each year and of this, approximately 45 million gallons are being collected for potential recycling. This amount is expected to increase tremendously because of increased regulations concerning ethylene glycol (EG), antifreeze's key component, environmental awareness, and possible business opportunities. Several technologies exist to perform EG recycling such as filtration, reverse osmosis, ion exchange and distillation. Spent antifreeze is currently being recycled either (1) off-site - where the spent antifreeze is gathered from various points of generation and transported to a central location where it is recycled, or (2) on-site - systems that can process large or medium volumes of spent antifreeze at a time on the premises, or by a portable recycling system that can recycle antifreeze one vehicle at a time.

Although the recycling of spent antifreeze (AF) is still a relatively new concept, a number of various industry participants are entering into the market for various reasons. Their driving forces may include profit generation, regulation compliance or environmental responsibility. This multiclient study examines all the facets of this growing industry and analyzes the strategic business opportunities available. *It is the only known study that gives an in-depth analysis of the entire antifreeze recycling industry.*

To assist companies in monitoring the rapid developments, analyzing the trends, and capitalizing on the many opportunities in the changing markets and technologies of the ANTIFREEZE RECYCLING INDUSTRY, Chemical Market Resources (CMR), with our extensive experience in the ethylene glycol industry, has undertaken a comprehensive business/technical strategic analysis that reports on the emerging opportunities in this industry. The major objectives of the study are to:

- *Assist EG producers and formulators in assessing the entire antifreeze recycling industry structure and their participation possibilities*
- *Provide waste haulers, off-site recyclers and on-site equipment manufacturers with an assessment of the current and future market needs and possible strategic options*
- *Assist companies in monitoring the regulations, technology and market developments*



KEY ISSUES ADDRESSED IN THE STUDY

- *Outline of the entire North American antifreeze recycling industry including players, markets, technologies, regulations, programs and trends*
- *Developments in recycling processes and technologies*
- *In-depth analysis of the environmental regulations, and how they effect/ will effect the antifreeze/ethylene glycol market*
- *Examination of the current recycling programs in North America*
- *Characterization of the antifreeze distribution system and raw material pricing*
- *Cost analyses of the available on-site recycling equipment*
- *Identification of the North American off-site recyclers and their volumes of spent AF collected, charges to their customers for service, and end use markets and pricing for recycled product*
- *Examination of the OEM policies and industry standards for recycled antifreeze*
- *Understanding of the current markets for recycled EG/AF*
- *Listing of the end use markets, translatable into opportunities for recycled EG*

SUBSCRIPTION INFORMATION

The NORTH AMERICAN ANTIFREEZE RECYCLING INDUSTRY strategic analysis report is currently available for subscription. To subscribe, simply sign and date the attached order form and mail/fax to us.

The subscription price includes:

- Two copies of the report including federal, state and province regulations pertaining to spent antifreeze, the driving forces for recycling and market participants, detailed cost analyses of the on-site recycling equipment, a strategic analysis of the antifreeze recycling industry, and pertinent appendices.



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METHODOLOGY

Chemical Market Resources has drawn on a variety of sources to develop the strategic analysis including:

- Information from private experts and CMR confidential files and databases
- Search, review and interpretation of information from government sources, trade and industry groups, published articles and promotional product information

Interviews The most important source of data for the report are the interviews completed by personal visits and telephone interviews. During the course of this project, the project staff has completed over 800 interviews with the following key individuals: ethylene glycol producers, antifreeze formulators, antifreeze blenders, inhibitor manufacturers, on-site recyclers, off-site recyclers, end users of recycling equipment and recycled antifreeze, waste transporters, OEMs, service stations, retail stores and government organizations. These interviews were the basis for determining the impact of the antifreeze recycling industry and strategic conclusions.

PROJECT MANAGEMENT

This study was managed and executed by Ms. Melissa A. Zurich, Dr. Balaji B. Singh and Mr. Mihir I. Patel, with the assistance from our associates in U.S., Europe and Japan.


MELISSA A. ZURICH obtained a Bachelor of Science degree in Marketing from the Pennsylvania State University and is currently pursuing an M.B.A. from the University of Houston, Clear Lake. Melissa has several years experience in various aspects of marketing research including questionnaire design and implementation, and data collection and analysis in the areas of specialty chemicals, plastics, and commodity chemical consumption patterns. She has completed several studies in the areas of ethylene glycol and recycling issues.

DR. BALAJI B. SINGH obtained his Ph.D. in Chemical Engineering from the Texas A&M University and an M.B.A. in Marketing Research and Strategic Planning from the Ohio State University. His key area of expertise is in opportunity evaluation and competitive assessment for technology and valued added specialty products in a broad spectrum of materials. Balaji has been following the ethylene glycol recycling industry for over five years and has completed various studies and has written several published articles pertaining to EG recycling. He has completed over 200 proprietary studies as a consultant to the chemicals and plastics industry.

MIHIR I. PATEL obtained his Master's degree in Chemical Engineering from Villanova University. Mihir has several years of research and production experience in the areas of reverse osmosis, photographic chemicals, polypropylene markets, tie layer materials, polyethylene markets, and UPR applications. He has completed extensive manufacturing cost analyses and contributes heavily to the technical requirements of CMR studies.

CHEMICAL MARKET RESOURCES is a marketing and management consulting firm, specializing in the analysis of plastics, petrochemicals and chemicals. The types of analyses include market status and forecasting, technology assessment, manufacturing cost analysis, competitive analysis and image/marketing effective analysis. Our strength is in providing cost-effective, documented, quantitative, actionable, quality analyses for our clients in a timely manner. Our goal is to work interactively with our clients to assist them in all aspects of strategic market planning for improved profits.



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1994 - 2000**

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