



Goldman Sachs

Fifth Annual Electronic Chemicals Investor Forum

Leveraging Technology to Become
The Investment In Industrial Gases,
Surface Technologies and Services

July 15, 2003

www.praxair.com



Mark Gruninger
Vice President - Praxair Electronics

Forward Looking Statements

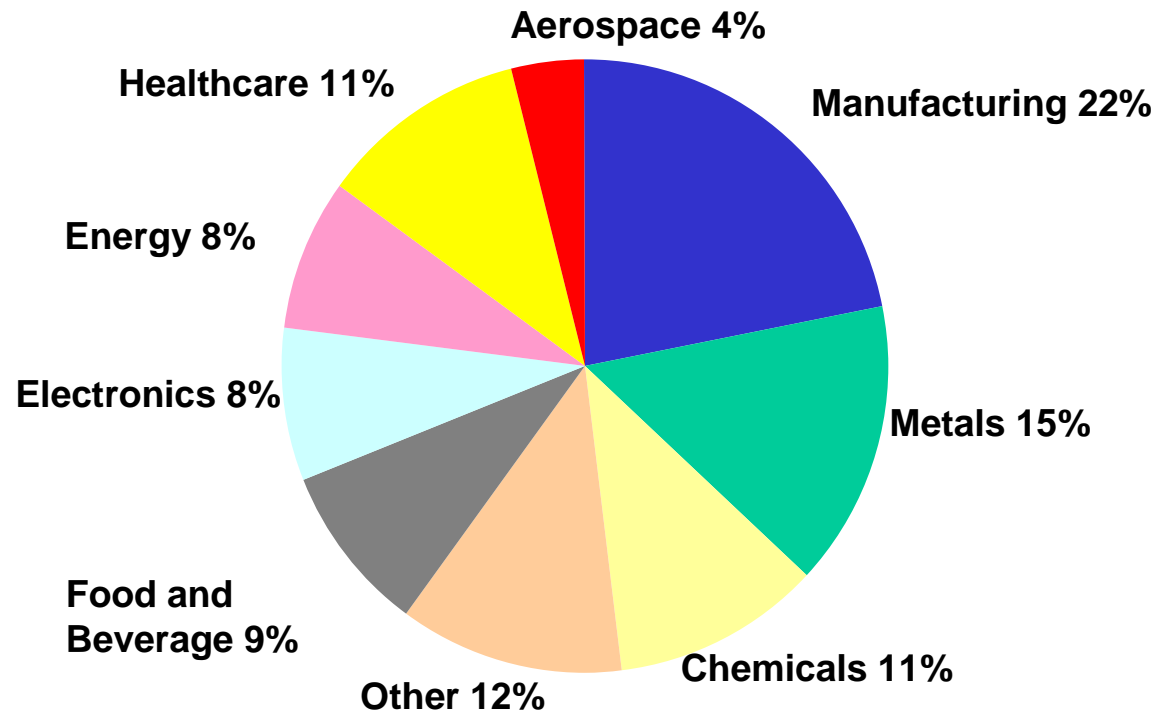
The forward-looking statements in this presentation concerning revenue, earnings, return on capital, volume, growth, economic growth rates, stock price performance, and the value of future product and service offerings involve risks and uncertainties, and are subject to change based on various important factors. These include the impact of changes in worldwide and national economies, availability and cost of power and other energy materials and the ability to recover these costs, pricing fluctuations in foreign currencies, changes in interest rates, the continued timely development and acceptance of new products and processes, the impact of technologies, competitive products and pricing, and the impact of tax and other legislation and regulation in the jurisdictions in which the company operates.

The technology discussed is included in U.S. and foreign patents and patent applications.

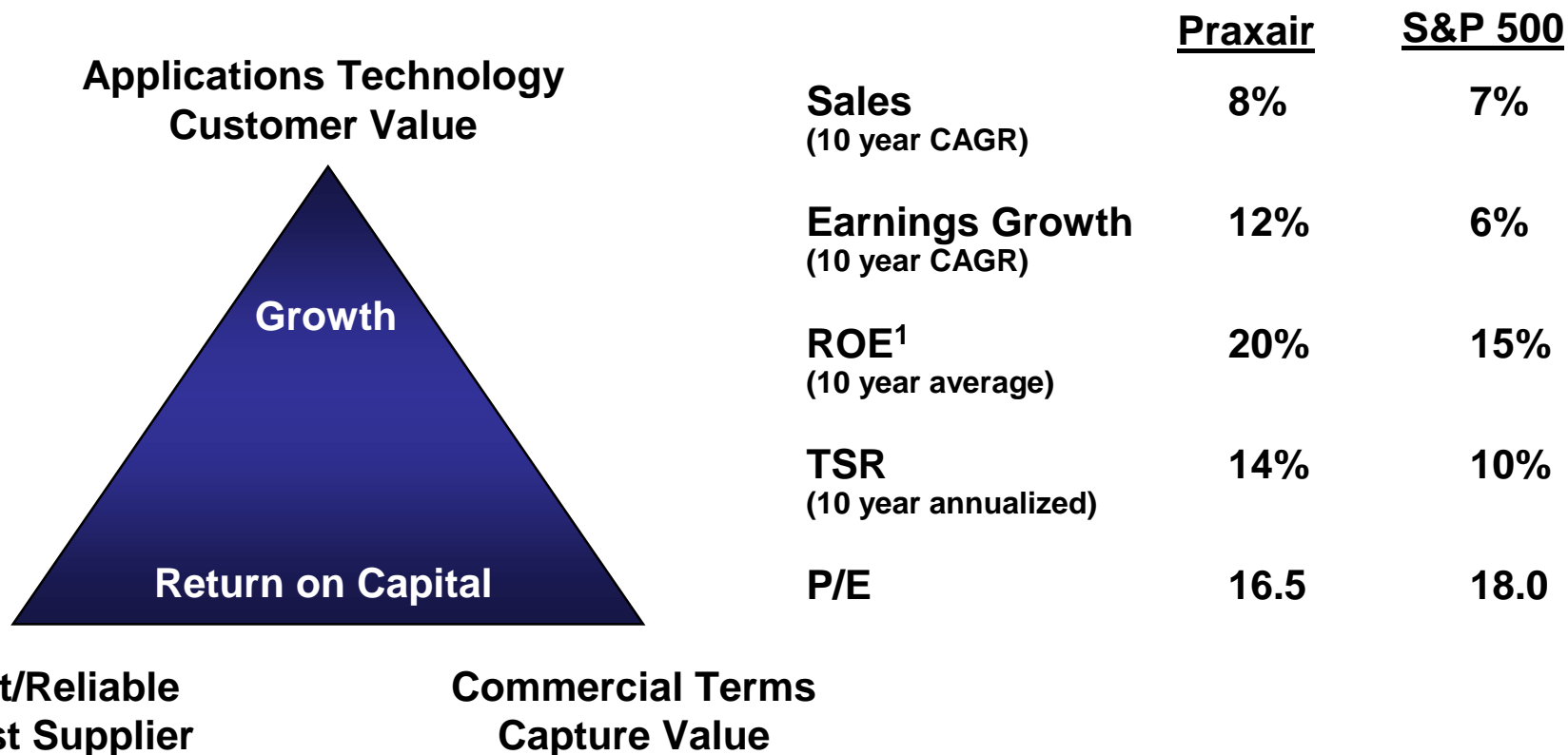
Praxair Snapshot

- ◆ 2002 sales: \$5.1 billion
- ◆ Robust business model
 - Long term contracts
 - Take or pays
- ◆ Broad customer base
- ◆ Providing key solutions at small fraction of cost stack

Praxair End Markets 2002



Operating Model Drives Growth and ROC



Shareholder Performance exceeds S&P 500

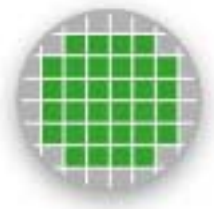
1. ROE = Net income before accounting changes/Shareholders Equity

Growth Opportunities

◆ Emphasis on growth segments

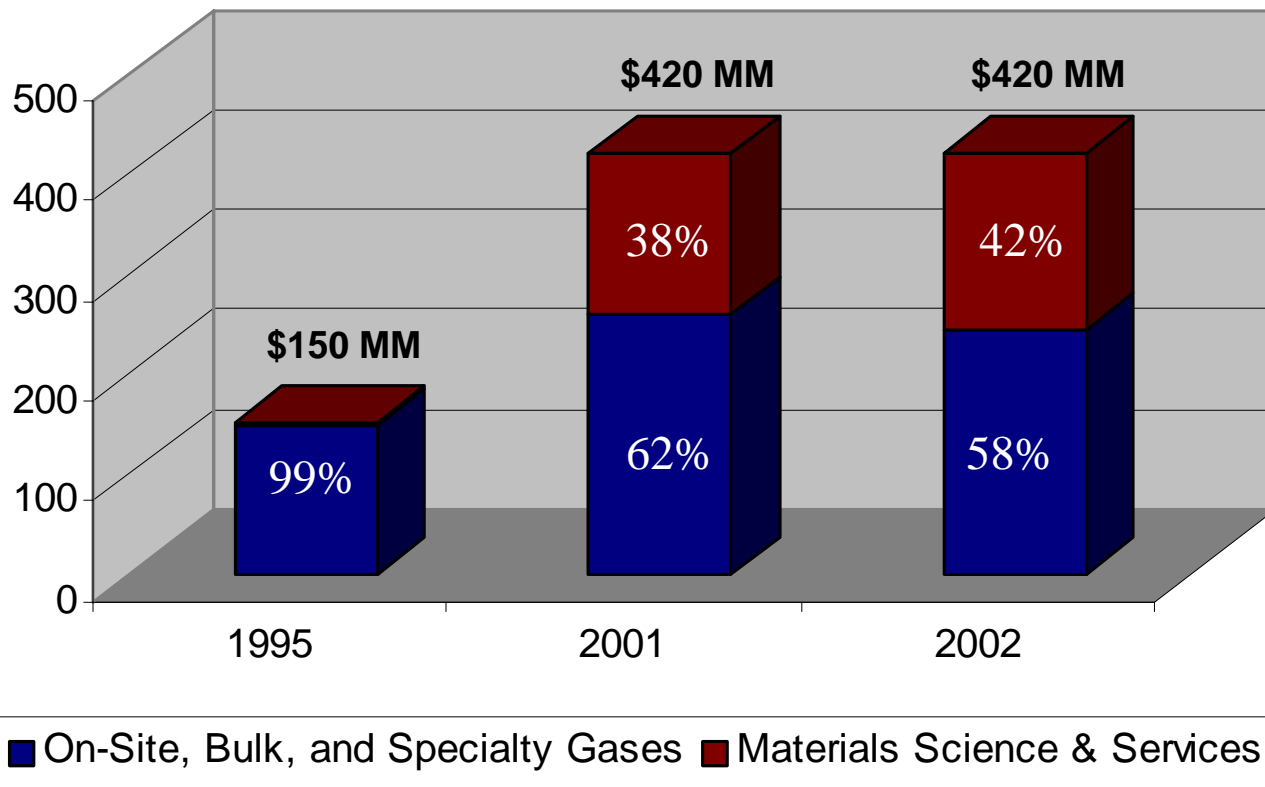
- Electronics
- Hydrogen
- Technology licensing
 - Energy & environmental
 - Metals
- Healthcare
- China expansion



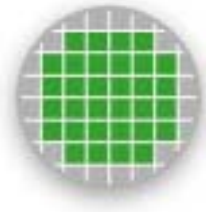


Growth From Materials Science and Services

Worldwide Electronics Sales

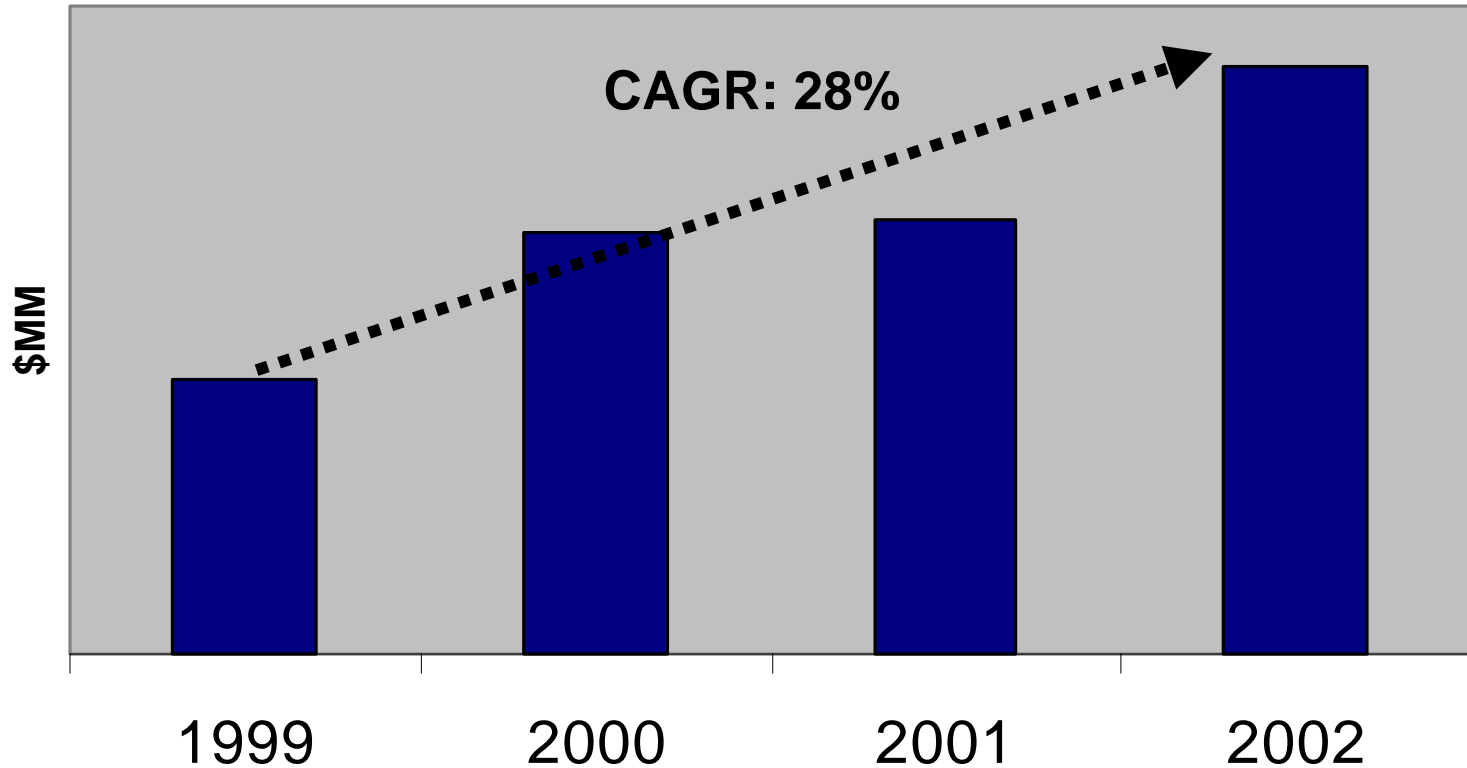


Focus on technology differentiation and service to drive growth



Significant Semiconductor Growth in Asia

Asia Electronics Sales

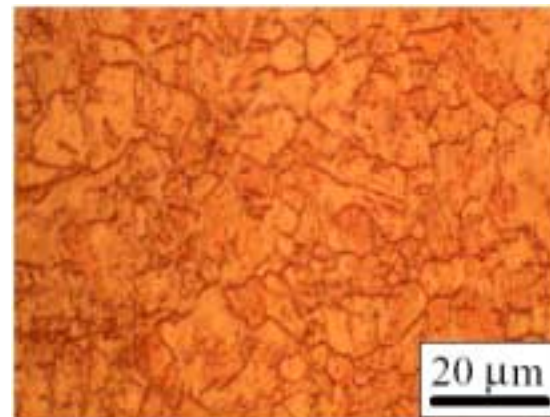


Asia is a primary source of growth



Next Generation Deposition Materials

- ◆ **A leading position in \$350MM PVD market**
 - Investing to meet growing 300mm demand: Cu, Ta, Co, and Ni
 - Competitive advantage in Ta
 - Controlled microstructure
 - Long life targets increase tool productivity by 30%
 - Ultrafine grain materials
 - Better film uniformity and device yield
 - Strong patent position
- ◆ **Product development with key OEM's**
- ◆ **Supplying 75% of the 300mm fabs operating globally**



UFG Cu

Grain Size: 3-10 microns



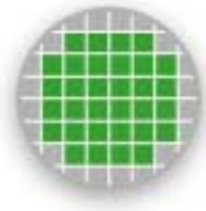
Growth in Advanced Components

- ◆ **Technically differentiated components for chamber applications**
 - Chamber components - e-chucks, electrodes, baffles
 - Ceramic materials
 - Coatings technology

- ◆ **Partnering with major OEMS**
 - Several 300MM qualifications
 - Supply chain management services

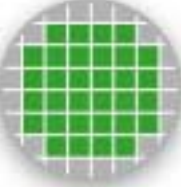
- ◆ **Increasing customer productivity**
 - Reducing particle generation increases product yield
 - Increasing corrosion resistance providing longer service life





Leading Edge Technologies in CMP

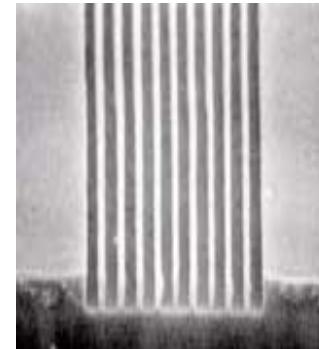
- ◆ **\$350MM CMP slurry market for semiconductor applications estimated at 15-20% CAGR over next 5 years**
- ◆ **Polishing formulation technology**
 - Leading supplier of alumina based polishing slurries
- ◆ **Enhanced customer solutions from H.C.Starck/Bayer alliance**
 - Joint development of slurry products
 - H.C Starck is a leading supplier of colloidal silica
 - Production capacity to supply 20% of market demand
 - Exclusive global sales and marketing of jointly developed products
- ◆ **Commercializing oxide products. Moving into copper.**
- ◆ **Key OEM alliance enhances product development**
- ◆ **Belts and pads provide integrated customer solution**



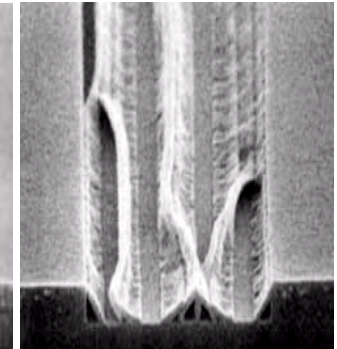
Supercritical CO₂ (SCCO₂) Enables Smaller Feature Sizes

- ◆ Current wet cleaning processes suffer yield problems as feature sizes shrink
- ◆ SCCO₂ is leading candidate for enabling dry cleaning solution
- ◆ Praxair/TEL SCCO₂ provides a unique solution
 - Demonstrated proprietary technology
 - Integrated CO₂ system and tool
 - First to market

Supercritical
CO₂ Process*



Current
Wet Process*





Strategic Positioning in Process Gases

◆ Product line focus

- Arsine, Phosphine, Silane, DCS, NF₃
- Integrated source for key process gases, services, and delivery systems
- Growth in Europe and Asia

◆ Uptime™ gas storage and delivery system

- Increased productivity primarily for ion implanters
- Significant customer cost of ownership improvement
- Patented, safe, drop-in system
- Multiple qualifications in progress



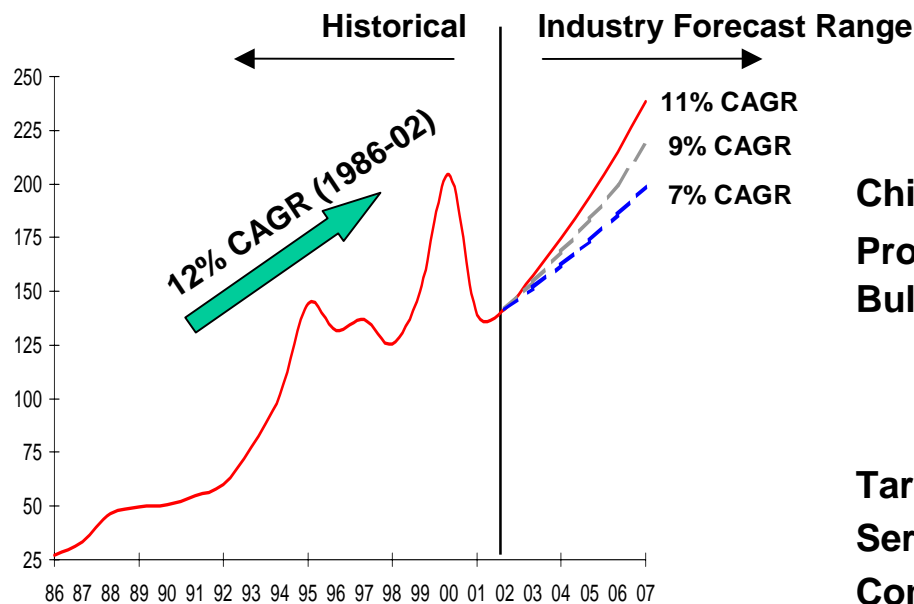
◆ Electronic Process Gas Innovation Center (EPIC) Oevel, Belgium

- State of the art cylinder cleaning, handling, filling for UHP gases



Industry Outlook

Worldwide Chip Sales (\$B)



2003-5 Forecasted Growth Rates

	<u>Praxair Market Assumption</u>	<u>Praxair Electronics</u>
Chip Volume (MSI)	6%	
Process Gases	4-5%	5-6%
Bulk/Onsite Gas		
Asia	> 9%	11%
Europe	1%	1%
NA	1%	1%
Targets	4-5%	5-6%
Services	> 9%	20%
Components	10%	15%

Focus on highest growth market segments to gain share and drive profitability



Goldman Sachs

Fifth Annual Electronic Chemicals Investor Forum

Leveraging Technology to Become
The Investment In Industrial Gases,
Surface Technologies and Services

July 15, 2003

www.praxair.com



Mark Gruninger
Vice President - Praxair Electronics