



Banc of America Innovation Conference Call

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

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www.praxair.com



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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**
- ◆ **92% industrial gases and related services, 8% surface technology**
- ◆ **Robust business model**
 - Long term contracts
 - Take or pays
- ◆ **Broad customer base**
- ◆ **Providing key solutions at small fraction of cost stack**



On-site 23%



Liquid 30%



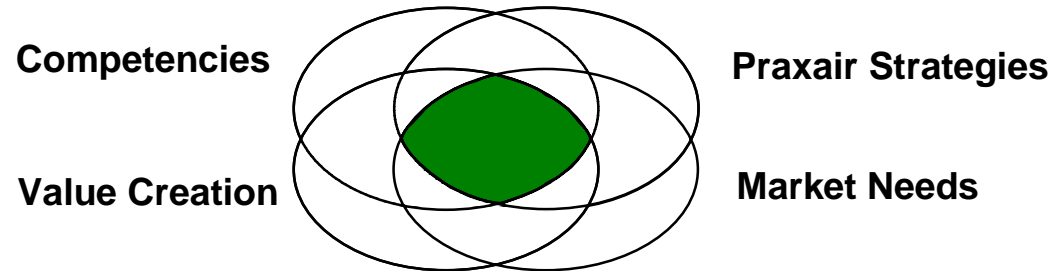
Packaged 33%



**Praxair Surface
Technology 8%**

R&D Strategies

◆ **Focus**



- ◆ **Leverage external capabilities**
- ◆ **Employ disciplined processes**
- ◆ **Drive business quality**
 - Grow top line
 - Increase productivity
 - Capture value
 - Improve ROC

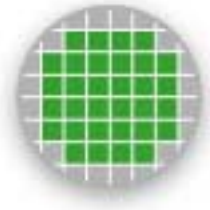
Growth Opportunities

◆ Emphasis on growth segments

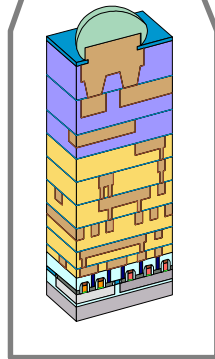
- Electronics
- Hydrogen
- Technology licensing
 - Energy & environmental
 - Metals
- Healthcare
- China expansion



◆ World class base business

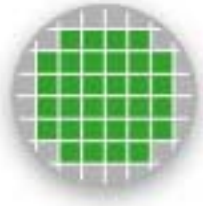


Focus on Consumables for Semiconductor Manufacturing



- ◆ **Enabling next generation devices**
 - 300mm wafers
 - Copper
 - Higher frequencies
 - Smaller line width

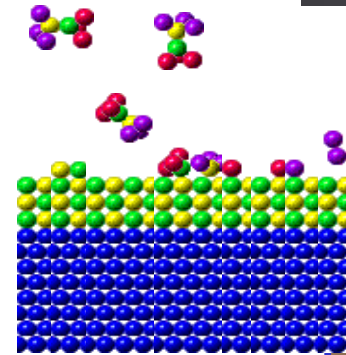
- ◆ **Enhancing customer productivity**
 - Increased emphasis on cost reduction
 - Roadmap extension

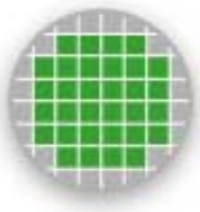


Praxair Materials Provide Next Generation Films

- ◆ **Leading PVD market share**
 - Investing to meet growing 300mm demand: Cu, Ta, Co, and Ni
 - Ultrafine grain materials
 - Better coating uniformity
 - Higher device yield

- ◆ **Expanding into CVD materials**
 - \$500 MM/yr market, 10-15% CAGR
 - Strong synthesis and applications capabilities
 - Unique materials and manufacturing routes
 - Significant customer pull

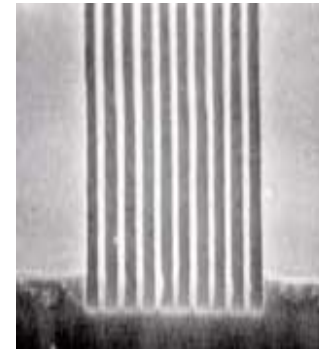




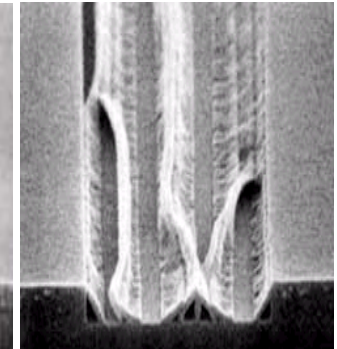
CO₂ Enables Smaller Feature Sizes

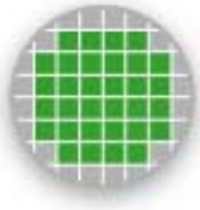
- ◆ **Wet chemicals for photoresist removal: \$400MM/yr, 8-10% CAGR**
- ◆ **Wet chemicals cannot meet future needs**
- ◆ **Praxair/TEL solution is leading alternative**
 - First to market
 - Requires 10-120TPD UHP CO₂
- ◆ **Intense interest from market leaders**
- ◆ **5 systems in operation**

Supercritical CO₂ Process



Current Wet Process



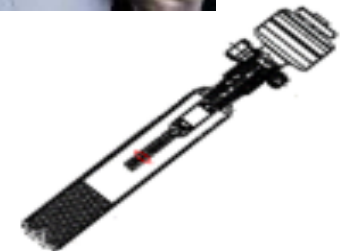


Enhancing Customer Productivity

- ◆ **Long life targets increase tool productivity 30%**
 - Unique designs for Ta, Cu, Ti and Al
 - Extended periods between target changes
 - Fewer semiconductor defects
 - Shorter burn-in time

- ◆ **Advanced components provide leading performance and 10-20% CAGR**
 - Ceramic materials
 - Coatings technology
 - Component design

- ◆ **Uptime™ provides 30-40% more product**
 - \$75MM/yr market
 - Patented, safe, drop-in system





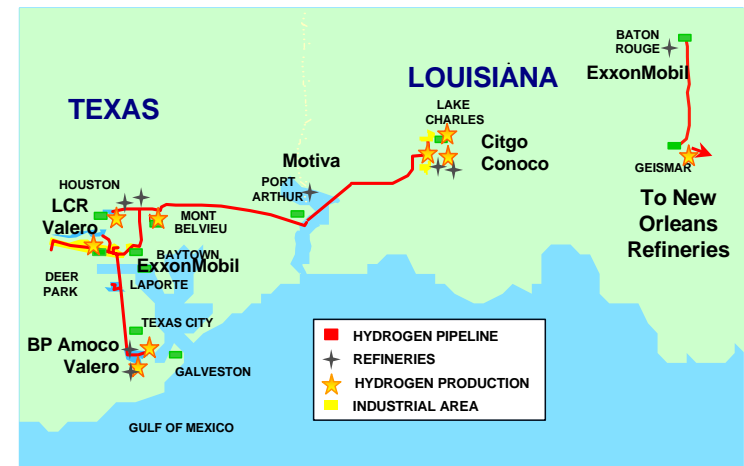
Strong Supply Positions and Leading Technology

◆ Refining

- Most US refining along Gulf Coast
- Connected to 85% of capacity
- Plan to sell additional 500 mmscfd by '06

◆ Fuel cells

- Largest producer of merchant H₂
- Fully integrated supplier



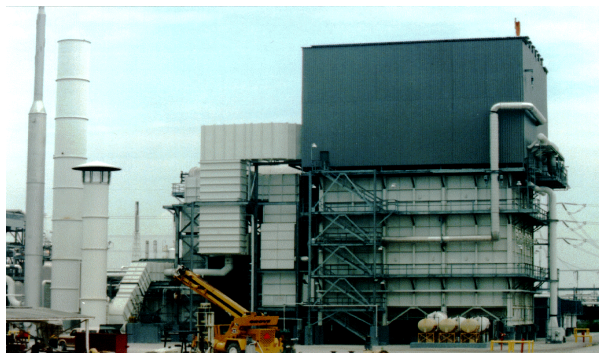


World Class Productivity for Enclaves

- ◆ **Real Time Optimization reduces variable cost**
 - Optimizes plants and pipelines
 - Reduces cost 5 -10%

- ◆ **Oxygen Enhanced Reforming increases productivity**
 - Simple retrofit, low capital
 - Increase H₂ production 10-20%
 - Increases efficiency
 - Demonstrated at 70 MMscfd reformer

- ◆ **Total hydrogen and energy solutions being offered to refiners**





Participating in Emerging Fuel Cell Markets

- ◆ **Portable and backup power: leading supplier to market leaders**
- ◆ **Transportation: selective participation**
 - Supplying major auto firms
 - Fuel station at LAX with BP



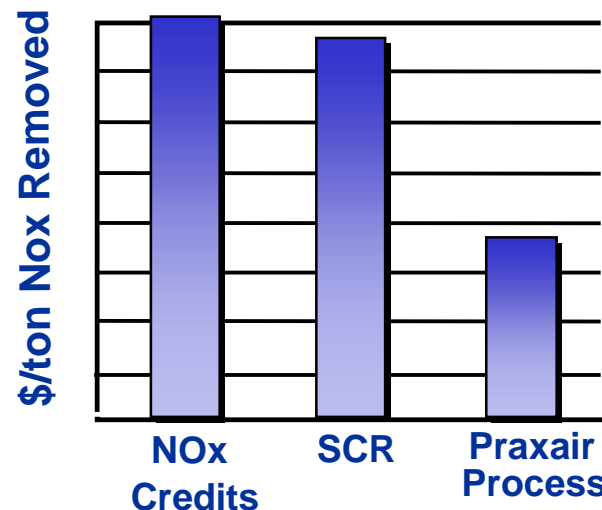
| Technology Development | Transportation | Power Generation | Current H ₂ Business |
|---|----------------|------------------|---------------------------------|
| High Purity H ₂ | ★ | ★ | ★ |
| Advanced packaging/filling | ★ | ★ | ★ |
| Versatile compression and storage platforms | ★ | | ★ |
| Small on-site generators | ★ | | ★ |
| Novel distribution solutions | ★ | | ★ |



Energy and Environmental: Reducing NOx from Coal-Fired Utilities

- ◆ EPA mandate: Reduce NOx below 0.15 lbs/MMBtu
- ◆ O₂ injection is low-cost solution
- ◆ Demonstrated at City Utilities
 - NOx reduced 50%
 - Opacity reduced 25%
 - Carbon in ash reduced 30%
- ◆ Applicable to wall and cyclone boilers below 500 MW

Typical Economics for 350MW

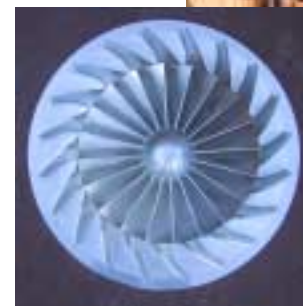
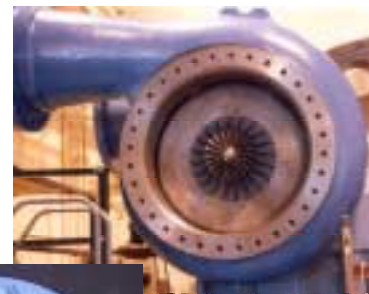




Energy and Environmental: Solutions Leveraging Competencies

- ◆ **Reducing NOx from process heaters**
 - Uses O₂ and patented burners
 - Installed with no downtime
 - Demonstrated at major Gulf Coast refinery
 - 70 MMBtu/hr furnace requiring 140 TPD O₂
 - 50% reduction in NOx
 - 25-30% efficiency improvement
 - 25% additional capacity

- ◆ **Increasing efficiency and capacity of air systems**
 - Proprietary aerodynamics and controls
 - Improves efficiency and/or throughput > 20%
 - Low capital





Praxair Metals Technologies

Industry credibility licensing metals technologies

Stainless - AOD

- Penetration - 75%
- Growth in China

Mini mills - EAF CoJet™

- Market - 280 MM tons
- Savings - \$2-4/ton
- Penetration - 10%
- 6 new licensees TYD

Integrated mills

◆ **BOF CoJet™**

- Market - 500 MM tons
- Savings - up to \$5/ton
- Penetration - 2 licensees (8 vessels)

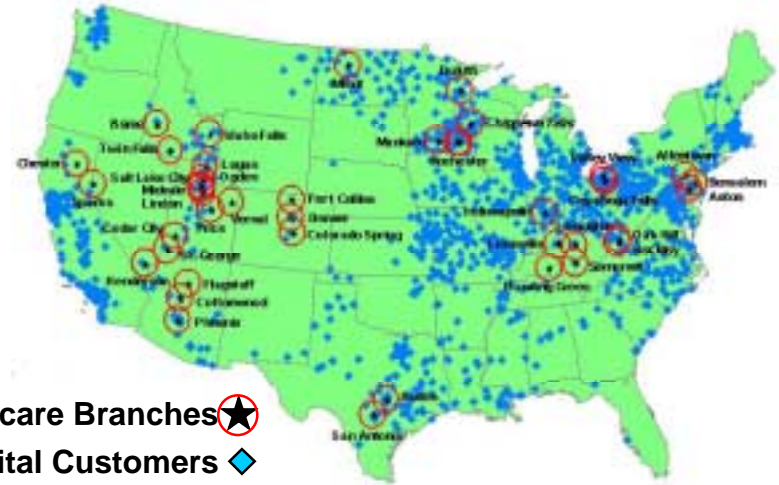
◆ **Product line extensions**





Leveraging Healthcare Supply Position

- ◆ #1 hospital position
- ◆ Expanding hospital products and services
- ◆ Growing homecare
 - Hospital-to-home
 - Acquisitions
- ◆ Only fully integrated U.S. supplier

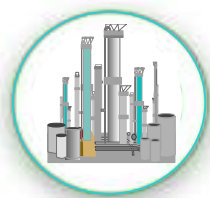




Driving Institutional Healthcare Growth

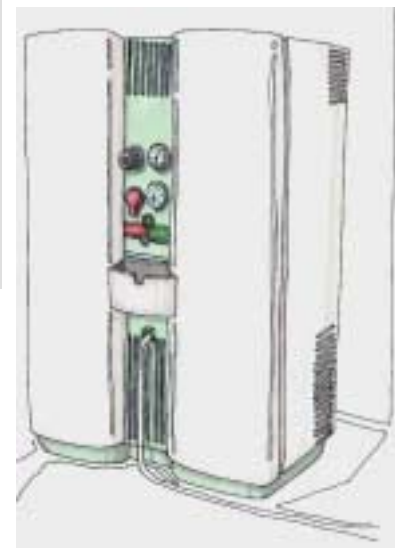
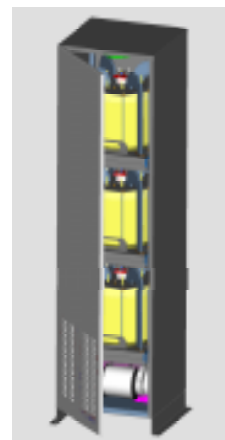
- ◆ **Heliox improves penetration of medications**
 - Targeting asthma, bronchiolitis, COPD
 - Potential \$90MM market
 - Asthma study at Pittsburgh Children's Hospital increased usage 30%
- ◆ **Argon and helium for cryosurgery**
 - An emerging alternative
 - Developing easy to use package for supply and control
- ◆ **Medical air provides reliability and security**
 - Over 340 installations in S. America and Europe
 - Migrating to N. America





Ceramic Oxygen Generators Improve Business Model

- ◆ **First viable small bulk and cylinder replacement (\$2.5B/yr market)**
 - High purity
 - High pressure
- ◆ **Lower cost to serve and cost of ownership**
- ◆ **Broader geographic coverage**
- ◆ **Initial target**
 - \$100MM laser market
 - \$100MM+ stationary workstations
- ◆ **2003 prototype; 2004 broad commercialization**



Summary

- ◆ **Focused on attractive growth markets**
 - Electronics
 - Hydrogen
 - Technology licensing
 - Healthcare
- ◆ **Leveraging strong market positions and differentiated technology**
- ◆ **Capturing value from gases, materials, services and licensing**
- ◆ **Maintaining our leading base business**



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