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Benefits of Established Industrial Partnerships
*PFC Emissions Reduction Partnership for the
Semiconductor Industry*

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Outline

- ◆ **Background Information**
- ◆ **Current Voluntary Agreement (MOU)**
- ◆ **Outgrowths of Voluntary Agreement**
- ◆ **World Semiconductor Council (WSC)**
- ◆ **WSC ESH Task Force**
- ◆ **Current Status**
- ◆ **Benefits**

Background Information

- ◆ **Semiconductor Manufacturing**
- ◆ **Experience with CFC Elimination**
- ◆ **Chemical Suppliers**
- ◆ **Traditional Command and Control Approach**

Voluntary Agreement

- ◆ **Common Agreements and Principles**
- ◆ **Company Responsibilities**
- ◆ **EPA Responsibilities**

Common Agreements and Principles

- ◆ Voluntary
- ◆ Between Individual Companies and EPA
- ◆ Recognition That PFCs Were Critical to Industry
- ◆ Recognition That Suitable Substitutes Had Not Been Identified
- ◆ Covered 6 Gases, CF_4 , C_2F_6 , C_3F_8 , CHF_3 , NF_3 , and SF_6
- ◆ Commitment to Work Together to Reduce PFC Emissions
- ◆ Identification of Industry as Highly Competitive and Global



Company Responsibilities

- ◆ **Prepare Annual Emissions Estimate**
 - Overall absolute PFC emissions
 - Normalized PFC emissions
 - Written methodology

- ◆ **Designation of Third Party to Collect, Aggregate, and Disseminate Information**

- ◆ **Commitment to Reduce Normalized PFC Emissions Following Pollution Prevention Hierarchy**

- ◆ **Share Information with EPA and Others**

EPA Responsibilities

- ◆ **Serve as Information Clearinghouse**
- ◆ **Provide Recognition for Participating Companies**
- ◆ **Seek Similar Commitments from All US Semiconductor Manufacturers**
- ◆ **Encourage Governments of Countries with Semiconductor Operations to Seek Similar Commitments**
- ◆ **Conduct Preliminary Assessments of Potential Substitute Chemicals**

Impact of Voluntary Agreement

- ◆ **Geo-Political**
- ◆ **Technological**

Geo-Political Impact

- ◆ **Discussions Between EPA and MITI (Ministry of International Trade and Industry)**
- ◆ **Establishment of World Semiconductor Council (WSC)**
- ◆ **Establishment of the WSC ESH Task Force**

World Semiconductor Council

◆ Members

- SIA Semiconductor Industry Association (US)
- EIAJ Electronics Industry Association of Japan
- EECA European Electronic Components Manufacturers Association
- KSIA Korean Semiconductor Industry Association
- TSIA Taiwan Semiconductor Industry

◆ Mission: to Lower Trade Barriers Through Cooperative Programs

◆ Environment, Safety, and Health

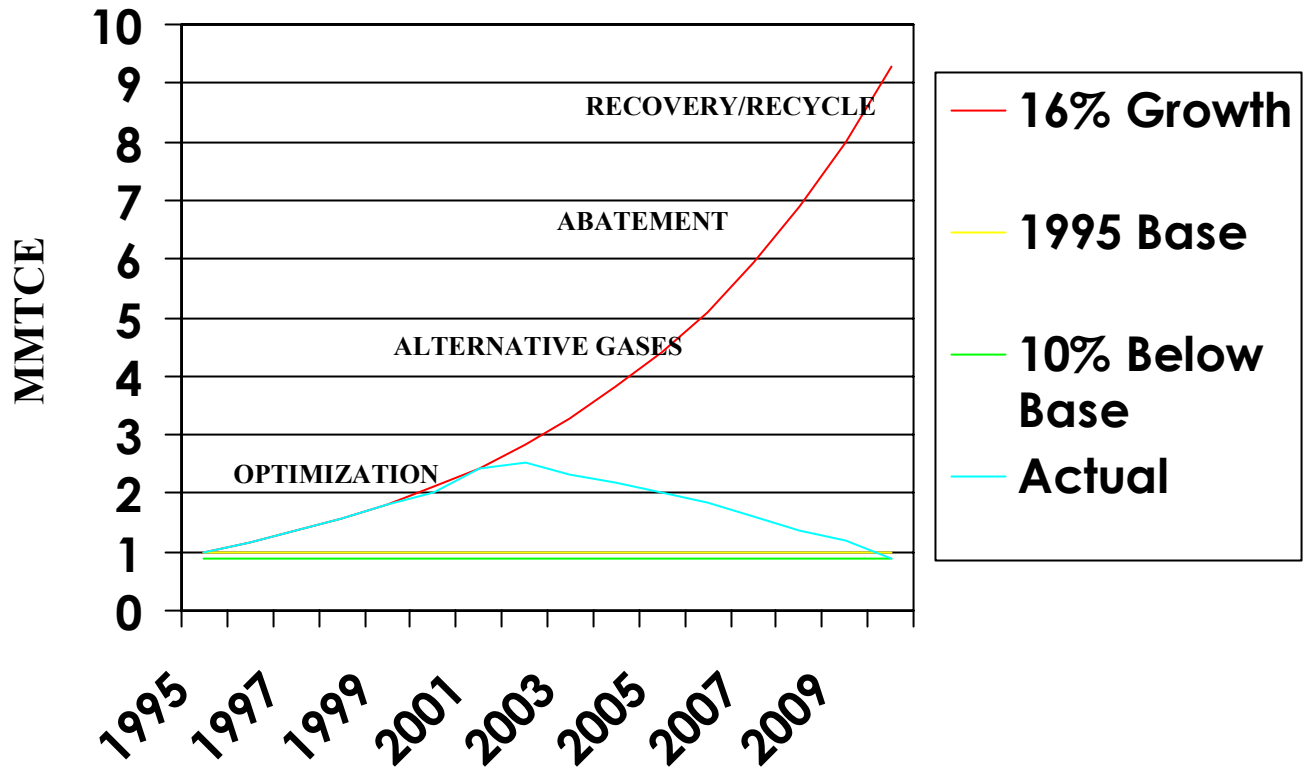
- Well suited for cooperative programs
- PFCs uniquely appropriate
- ESH Task Force



WSC ESH Task Force Accomplishments

- ◆ **Sharing of Information**
- ◆ **Engaging Tool and Chemical Suppliers**
- ◆ **Establishing Common Metrics and Measurement Methodologies**
- ◆ **Created and Instituted Global PFC Emission Reduction Goal**
 - **Reduce absolute PFC emissions to at least 10% below baseline**
 - **Industry association goal, not individual company goal**

Reduction Strategy



Technological Advances

- ◆ **New Processes**
- ◆ **New Chemistries**
- ◆ **New Abatement Devices**

Research Centers

- ◆ **United States**
 - **International SEMATECH**
 - **NSF/SRC Engineering Research Center for Benign Semiconductor Manufacturing (ERC)**

- ◆ **Japan**
 - **ASET**
 - **RITE**

- ◆ **Europe**
 - **IMEC**

- ◆ **Taiwan**
 - **ITRI**

- ◆ **Korea**
 - **Semiconductor Clean Technology Center**



Current Status

◆ International

- Global PFC emission reduction program underway
- Each association has agreed to a base year and base emission
- WSC ESH Task Force working on guidelines for voluntary action plans based on consensus emissions reduction goal
- WSC ESH Task Force is evaluating additional EHS issues to work on

◆ United States

- Industry and EPA working on next MOU
- MOU will be partnership between EPA and SIA
- Consensus Emission Reduction Goal and IPCC guidelines will be basis for new MOU
- Much simpler process



Benefits

- ◆ **Friendlier Process**
 - ◆ **Cost Effective**
 - ◆ **Encourages Innovative Solutions**
 - ◆ **Faster Implementation**
 - ◆ **Shared Responsibility**
 - ◆ **Win-Win**
 - ◆ **Led to Global Initiative**
 - ◆ **Shared Technology Development**
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- ◆ **More Rational Approach to Global Environmental Problems**