Docket Optical System - Semiconductor Industry comments for Docket 04-CCCA-1 and Docket 04-IEP-1B and Climate Change

DOCKET
04-CCCA-1
DATE AUG 19 2005
RECD. AUG 19 2005

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Date: 8/19/2005 3:07 PM
Subject: Semiconductor Industry comments for Docket 04-CCCA-1 and Docket 04-IEP-1B and Climate Change
CC: "Susan Brown" <Sbrown@energy.state.ca.us>, <gfranco@energy.state.ca.us>

Dear Sir or Madam:

I am submitting the following comments regarding the recommendations the Energy Commission and Climate Action Team are considering around PFC emission reductions in the semiconductor industry. I am submitting them as a representative of the semiconductor sector on the California Climate Change Advisory Committee.

Background:
One of the recommendations made by the Center for Clean Air Policy at the July 11 California Climate Change Advisory Committee meeting was to reduce PFC emissions in the semiconductor industry. According to the report "Emission Reduction Opportunities for Non-CO2 Greenhouse Gases in California," prepared by ICF Consulting, emissions are projected to increase from 1.03 MMTCO2e in 2000 to 3.36 and 7.74 MMTCO2e in 2010 and 2020, respectively. The 2000 emissions data was obtained from the EPA's voluntary PFC reduction MOU with the Semiconductor Industry. The report also estimates that "the current (2002) share of semiconductor manufacturing attributable to fabrication facilities (fabs) in California would remain constant through 2020." The emissions for California were estimated "by comparing the ratio of manufacturing in California to that in the United States as a whole (Census Bureau 2005), expressed in terms of total value of shipments. Based on this analysis, California's share of national manufacturing was estimated to be 16 percent of the U.S. total."

Analysis:
Manufacturing: The PFC MOU participants have primarily R&D facilities in California. There is little manufacturing capacity and no plans to build any new facilities. In fact, the number of manufacturing fabs in California has steadily decreased since a peak around 1996. For the R&D facilities, emissions are small and highly variable. We recommend that any reduction goal exempt emissions from R&D operations. Setting a reduction goal without such an exemption could impact the ability to conduct the research required to generate the next generation of semiconductors or result in the relocation of those activities outside the state.

Emissions Trend: The ICF report estimates an increase in PFC emissions as a result of an increase in manufacturing output. Information compiled by the SIA shows a decrease in PFC emissions with an increase in manufacturing output between 1999 and 2004. U.S. PFC emissions in 1995 were 3.67 MMTCO2e. They peaked at 5.46 MMTCO2e in 1999. In 2004, emissions were 2.79 MMTCO2e (see attached slides from SIA). For California companies participating in the MOU, PFC emissions at their California facilities were less than 0.4 MMTCO2e in 2003. We expect these emissions to remain flat through 2020.

Mitigation Options: The report suggests five mitigation options for reducing emissions. The MOU participants have or are in the process of installing control technologies in their operations. They routinely consider new mitigation technology and upgrade, when appropriate. The report assumes that no additional mitigation actions have occurred since 2000, which is an incorrect assumption. Several of the California PFC MOU participants have installed and are upgrading mitigation options.

Additional information: We recommend the Commission and the Climate Action Team review the 2005 PFC State of Technology Report due to EPA on December 15 as an additional source of information on semiconductor PFC emissions. This report will contain an analysis of historical U.S. PFC emissions and a projection of World Semiconductor Council PFC emissions through 2010 based on current manufacturing and emission trends. It will also discuss the technology currently in development or in use by semiconductor manufacturers, including process optimization, remote cleans, alternative chemistries, and new abatement technology. Finally, it will detail how companies in our sector have reduced their emissions and what future options are being considered to maintain the reductions.

Conclusion:
The semiconductor industry is the first industry to voluntarily agree to establish an absolute PFC emissions reduction goal on a worldwide basis and has made significant progress in achieving that goal. In California, emissions are currently less than 0.4 MMTCO2e. In considering future PFC reduction goals, we ask the state to give credit for the reductions that have already been achieved through voluntary efforts and allow future flexibility for R&D operation. As participants in the effort to reduce PFC emissions on a national and international basis, we recognize the importance of reducing greenhouse gas emissions and recommend the Commission and the Climate Action Team consider the recommendations based on the SVLG Climate Change Guiding Principles to obtain additional reductions from not only the semiconductor, but all industries in the state of California.

Respectfully Submitted,

Robert Parkhurst

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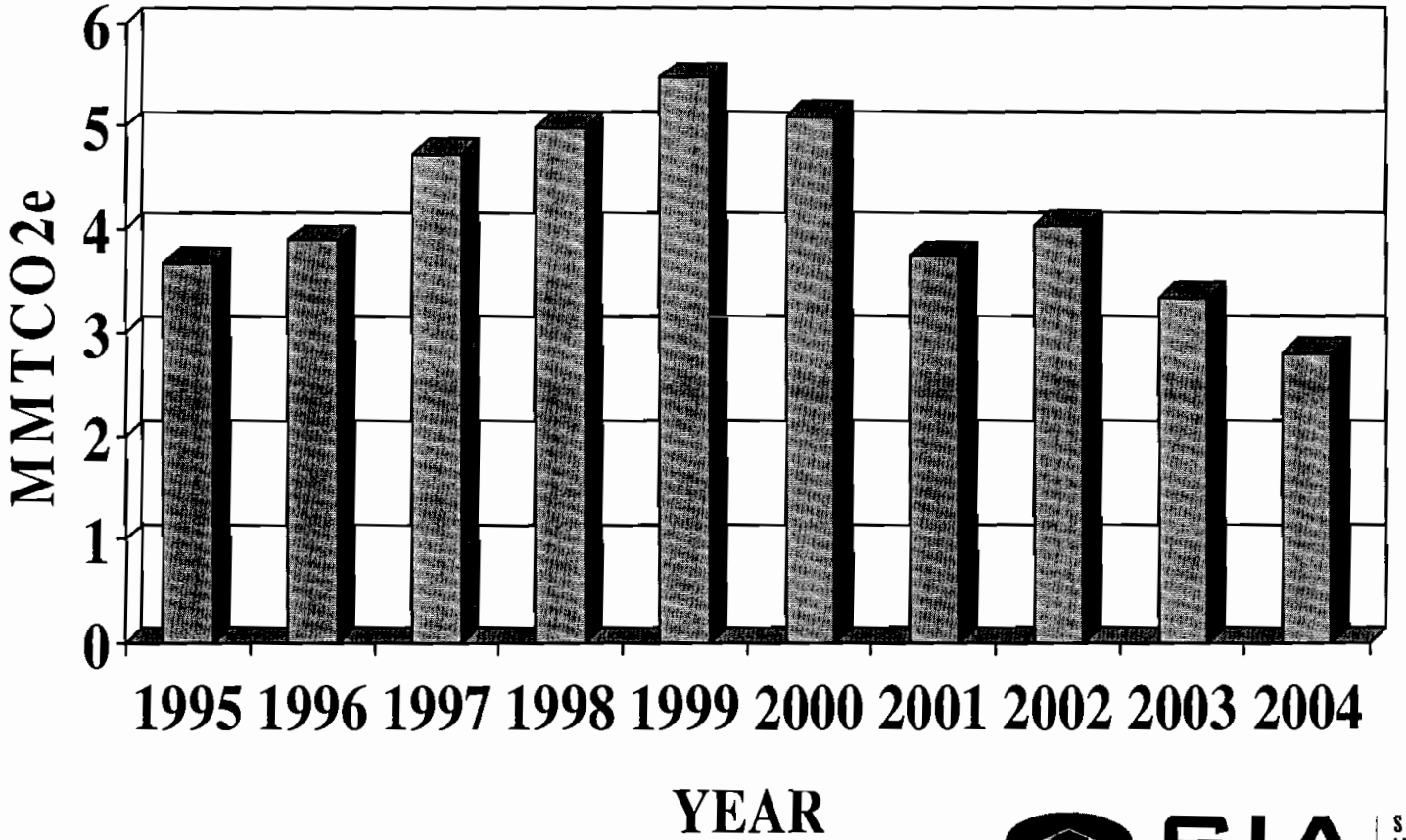
SIAPFC Emission Reduction Goal

- Established in 1996
  - Set SIA goal at 10% below 1995 baseline value
  - Included six gases
    - CF4
    - CHF3
    - C2F6
    - C3F8
    - NF3
    - SF6
  - Adopted as International Goal
    - ESIA
    - JSIA
    - KSIA
    - SIA
    - TSIA
- Developed Process for Adding Gases and Added c-C4F8 in 2002

SIA SEMICONDUCTOR INDUSTRY ASSOCIATION

SIA Partners PFC Emissions



SIA SEMICONDUCTOR INDUSTRY ASSOCIATION