

AB 32 Discrete Early Action Measure

Semiconductor and Related Devices Third Public Workshop



**California Air Resources Board
Sacramento, CA
September 2, 2008**

Outline

- Background
- Proposed Performance Standards
- Emissions and Emission Reductions
- Reporting and Recordkeeping Requirements
- Current and Future Activities

Background

- The California Global Warming Solutions Act of 2006 requires the ARB to identify a list of discrete early action greenhouse gas emission reduction measures.
- On October 25, 2007, the Board approved the Semiconductor and Related Devices Emissions Reduction Strategy as a discrete early action measure.
- Two workshops held to discuss applicability, definitions, and survey results.
- This measure is scheduled for Board consideration in December 2008.

Proposed Performance Standards (Semiconductor and Related Devices) Effective 1/1/2012

CVD Chamber Cleaning and Etching Processes	
Category (Million Sq Cm Per Calendar Year)	Maximum Emissions Per Square Centimeter for a Calendar Year (Kg CO ₂ e/cm ²)
Tier 1: >37.7	0.20
Tier 2: >3.7 and ≤37.7	0.30
Tier 3: ≤3.7	0.50

Performance Standards cont...

(Semiconductor and Related Devices)

- Sulfur hexafluoride
 - Prohibit use for CVD chamber cleaning in Tier 1 and Tier 2 categories
- No impact on etching process

Emissions and Emission Reductions

CVD Chamber Cleaning and Etching Processes				
Category	Number of Operations	Emissions (MMTCO ₂ e)	Percent Complying Market Share	Emission Reductions (MMTCO ₂ e)
Tier 1	5	0.16	57	0.11
Tier 2	11	0.071	43	0.031
Tier 3	12	0.023	42	0.017
Reporting Only	57	0.023	NA	NA
Total	85	0.27	NA	0.16

Operations Impacted

- **Tier 1**
 - 3 operations would be required to reduce emissions
 - 2 currently comply with the proposed standard
- **Tier 2**
 - 6 operations would be required to reduce emissions
 - 5 currently comply with the proposed standard
- **Tier 3**
 - 6 operations would be required to reduce emissions
 - 6 currently comply with the proposed standard

Tier 1 Operations

(Proposed Standard 0.2 kg CO₂e/cm²)

	Complying	Noncomplying
Number of Companies	2	3
Emissions Range (kgCO ₂ e/cm ²)	0.02 to 0.18	0.77 to 1.2
Abatement	2 CVD and etch abatement	2 no abatement, 1 CVD abatement

Tier 2 Operations

(Proposed Standard 0.3 kg CO₂e/cm²)

	Complying	Noncomplying
Number of Companies	5	6
Emissions Range (kgCO ₂ e/cm ²)	0.003 to 0.3	0.35 to 1.2
Abatement	2 CVD and etch abatement, 3 no abatement	6 no abatement

Tier 3 Operations

(Proposed Standard 0.5 kg CO₂e/cm²)

	Complying	Noncomplying
Number of Companies	6	6
Emissions Range (kgCO ₂ e/cm ²)	0.04 to 0.26	0.78 to 8.14
Abatement	1 CVD and etch abatement, 1 CVD abatement, 1 etch abatement, 3 no abatement	5 no abatement, 1 CVD abatement

Reporting Requirements

- Initial Reporting Requirement
- Annual Emissions Reporting
 - Submit March 1st of each calendar year
 - Receive March 15th of each calendar year
 - Contents:
 - Fluorinated gas volumes (Kg)
 - Wafer production in square centimeters
 - Tier 2b emissions
 - Heat transfer fluid (HTF)

Reporting Requirements (cont'd)

- Operations that emit 0.0008 million metric tons or less of CO₂e per year
 - Primarily research and development operations

Recordkeeping Requirements

- Fluorinated gas usage and HTF purchase/usage volumes and dates, 5 years
- Equipment malfunctions or failures, 5 years
- Information may be designated confidential

Current and Future Activities

- Assessing measure cost
- Staff report release: October 24, 2008
- Board Hearing: December 11, 2008
- Regulation legally effective:
January 1, 2010

Reminder

- Today's presentation is posted at:
www.arb.ca.gov/cc/semiconductors/meetings/meetings.htm
- The semiconductor list serve is at:
www.arb.ca.gov/listserv/semiconductors.htm

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Questions and Comments?