

Comments of the Semiconductor Industry Association (SIA)
On the
2015 Revisions and Confidentiality
Determinations for Data Elements
Under the Greenhouse Gas Reporting Rule

81 Fed. Reg. 2536 (January 15, 2016)

Docket ID No. EPA–HQ–OAR–2015–0526

The Semiconductor Industry Association (SIA) submits these comments to the U.S. Environmental Protection Agency (EPA) on the proposed “2015 Revisions and Confidentiality Determinations for Data Elements Under the Greenhouse Gas Reporting Rule,” 81 Fed. Reg. 2536 (January 15, 2016).

SIA is the trade association representing leading U.S. companies engaged in the design and manufacture of semiconductors. Semiconductors are the fundamental enabling technology of modern electronics that has transformed virtually all aspects of our economy, ranging from information technology, telecommunications, health care, transportation, energy, and national defense. Innovations in semiconductor design and manufacturing have resulted in increasingly smaller, more powerful, less expensive, and more energy efficient semiconductors, which has a “multiplier effect” that drives advancements throughout other sectors of the economy, resulting in increased growth, jobs, and productivity. In addition to the economic importance of this industry, semiconductors have strategically important applications that ensure U.S. military superiority. The U.S. is the global leader in the semiconductor industry, and continued U.S. leadership in semiconductor technology is essential to America’s continued global economic leadership. More information about SIA and the semiconductor industry is available at www.semiconductors.org.

SIA’s comments pertain to EPA’s (a) proposed changes to the Triennial Report data requirements and (b) the proposed revisions to Equation I-24.

Proposed Changes to the Triennial Report Data Requirements

EPA proposes various changes to the Triennial Report data requirements currently set forth in Subpart I. Among other things, EPA proposes to require that reporters provide additional data on utilization and by-product formation rates and/or destruction or removal efficiency data. EPA states that this information is needed “to effectively evaluate how emissions may vary by wafer size, film type, substrate type, linewidth or technology node, and process type or process subtype.” 81 Fed. Reg. at 2555-2556. EPA further states that the current subpart I is based on the recognition that emission factors vary significantly by wafer size and process type and subtype, and “given the high rate of technical evolution in this sector, film type, substrate type, and linewidth may also increasingly affect emission factors.” Id.

EPA states that the proposed changes would “clarify the types of data and measurements to be submitted with the triennial report, but would not fundamentally alter the data reported or require additional data collection from reporters.” 81 Fed. Reg. at 2541. We disagree, and we have several concerns with this new requirement.

- This new requirement is inconsistent with the terms of the final rule that was carefully negotiated between EPA and SIA. In the final rule, EPA did not specify the emissions and DRE data elements to be reported but, instead, established their expectations in the preamble: “We anticipate that the types of information submitted would include information similar to that submitted to inform the default emission factors and default DREs in today’s rule.”¹ EPA provides no explanation for why their reasoning has changed and why current guidance included in the preamble is no longer sufficient.
- EPA did not provide justification for the proposed changes and some of the information being requested in the proposal is not relevant to setting accurate emissions factors; most of the information is not required to set default abatement destruction or removal efficiency (DRE) factors. SIA provided extensive data during the development of Subpart I, which clearly established that wafer size and input gas are the factors which best characterize etch process emissions considering precision, accuracy, and technical feasibility.
- The proposed changes add more complexity and burden to the task of collecting data and compiling the report, and, because emissions and DRE data are not considered to be confidential business information (CBI), risk the disclosure of CBI.
- At minimum, any future changes to the triennial report should await the filing of several triennial reports so that EPA and the semiconductor industry can assess whether changes to this report are warranted.

1. **Consideration of Proposed Changes to the Triennial Report Should Be Deferred Until After the Filing of the 2017 Report**

EPA and SIA engaged in extensive and detailed negotiations to resolve the petitions for review and reconsideration filed by SIA in response to the promulgation of the original Subpart I, and the revised Subpart I final rule substantially reflected the principles agreed to during those discussions. As part of this agreement, SIA agreed to the filing of a triennial report, even though it appears that no other industry sector is required to file a similar report. SIA companies have been collecting data since 2014 and are beginning preparations for the filing of the first report in early 2017 based on the 2013 final rule.

It appears that some of the proposed changes in the requirements for the triennial report go beyond the original goals of the report. In the original rule, “Greenhouse Gas

¹ *Federal Register*, Vol. 78, No. 219, Wednesday, November 13, 2013, p. 68196

Reporting Program: Final Amendments and Confidentiality Determinations for Electronics Manufacturing,” 78 Fed. Reg. 68162 (Nov. 13, 2013), EPA stated that the goal of the report is to determine whether technology changes in the industry result in changes to GHG emissions in a way that warrant changes to the emissions factors. The goal is not to expand the scope of the data submitted by the industry in the hope that it might improve or refine the existing emissions factors. The preamble states:

The report must address how technology and processes have changed in the industry over the previous 3 years and the extent to which any of the identified changes are likely to have affected the GHG emissions characteristics (i.e., the identity, amount, frequency, concentration, or other characteristics related to GHG emissions) of semiconductor manufacturing processes in such a way that the default gas utilization rates and by-product formation rates and/or default DRE factors in subpart I may need to be updated or augmented.

78 Fed. Reg. at 68174. SIA supports the original goal articulated by EPA in requiring the triennial report, but we believe that the proposal increases the scope of reporting beyond this original goal. EPA states that the new data is being sought in order to “enable the EPA to better understand the data being submitted and to better apply it in the development of new or revised emission factors,” 81 Fed. Reg. at 2555, even if new or revised emission factors are unrelated to technology changes to the industry. Whatever the merits of collecting data to improve the existing emission factors, these new data requirements should not be imposed as part of the triennial report, which is intended solely to determine if technology changes in the industry warrant revisions to the manner of calculating emissions.

During settlement negotiations, SIA submitted a substantial body of process emissions characterization and abatement DRE data sets; this data allowed EPA to establish the default emission and abatement DRE factors contained in the rule. Certain data provided had little impact on emission factors; EPA now proposes going beyond the data voluntarily provided by the industry to require data that does not impact emissions, is not typically collected during testing, and which may disclose IP.

EPA has now proposed that additional data be included in the triennial report, including reporting of film type being manufactured, substrate type, and linewidth or technology node for any process emissions and abatement DRE data, even before reporters have filed their first report. It makes little sense to add these data reporting requirements now before reporters have completed even the first reporting cycle. At minimum, they should await the filing of the first triennial reports before making any changes.

EPA asserts that the proposed changes “are needed to improve the clarity of the calculation requirements and quality of the data collected under subpart I and to improve the EPA’s understanding of GHG emissions from the electronics manufacturing sector.” 81 Fed. Reg. at 2555. However, EPA provides no discussion relating to how

the current calculation requirements are not clear, how the quality of the data is lacking, nor why it better needs to understand GHG emissions from the electronics industry. The reporting rule is just that – a rule requiring reporting of GHG emissions, which is the only data that EPA should be interested in, as discussed in great detail during the settlement negotiations. Even before the first triennial reports are filed, EPA concludes without offering any data that changes are needed to the reports to be filed. SIA provided EPA with extensive data leading up to the development of rule on the data elements needed to assure accurate emissions reporting from the semiconductor industry (see Section 2 below), and in promulgating the final rule in 2013 EPA agreed that these data elements were appropriate. Before concluding that additional or different information is needed, EPA should review the triennial reports to be filed in 2017 and consult with the industry on whether any additional information is needed in future reports.

2. EPA is Seeking to Add Information Irrelevant in Determining Accurate Emission Factors

EPA proposes a common set of data be reported in the triennial report for any utilization, by-product formation rate, and/or DRE data submitted. EPA states that it needs information on the input gases used, methods used for measurement, and measured utilization rates and byproduct formation rates “for the development of accurate and useful emission factors.” 81 Fed. Reg. at 2556. SIA agrees and provided this information with data sets submitted during settlement negotiations leading up to the existing rule; however, EPA now proposes expanding data requirements beyond what was previously provided and deemed to be adequate to develop default factors. During the development of the revised Subpart I, SIA submitted substantial information on the data elements needed to develop accurate emission factors. The data showed that wafer size and input gas are the factors which best characterize etch process emissions considering precision, accuracy, and technical feasibility, and that several other data elements were not statistically relevant to calculating emissions factors.

In SIA’s “Report to EPA on Etch Factor Proposal for Fab GHG Emissions Reporting” (February 28, 2012), Docket EPA-HQ-OAR-2011-0028-0052, SIA conducted detailed analysis of the statistical relationships of 13 attributes of the etch process to etch emissions and the determination of which attributes best modeled etch process emissions. The relevant portion of this report states as follows:

3.2.3 Data issues presented by the three factor model

Two models were carried forward in the analysis. However, there are difficulties with emission factor calculations when the data is broken into the smaller and smaller distinct groups that come with additional model parameters. The number of distinct groups and summary of these model approaches is give below:

- *2-Factor model (Gas, Wafer Size) has 19 categories with associated gas use and gives a 57% R2.*

- *3-Factor model (Gas, Wafer Size, Film) has 43 categories with associated gas use and gives 60% R2; this is much more complex and impacts only the etch portion of industry's F-Gas emissions estimate.*

Table 3-3: Summary of Models Considered – Etch Data Set

Model Parameter(s)	Model R2
<i>Input Gas</i>	<i>55%</i>
<i>Principal Film Type</i>	<i>5%</i>
<i>Power</i>	<i>18%</i>
<i>Pressure</i>	<i>4%</i>
<i>Wafer Diameter</i>	<i>12%</i>
<i>Wafer Diameter, Input Gas</i>	<i>57%</i>
<i>Wafer Diameter, Input Gas, Principal Film Type</i>	<i>60%</i>
<i>Wafer Diameter, Input Gas, Power</i>	<i>59%</i>

The 3-factor model has more than twice as many populated factor combinations or categories as the 2- Factor model. Any potential benefit of a small model improvement (3%) in the 3-factor model would come at the expense of having to apportion gas use to the larger number of categories (with associated error being introduced) and the need to use data at a level of detail that is considered confidential business information.

This information shows that the two factor data elements – wafer size and gas used, coupled with process type – are relevant to ensuring the accuracy of emissions factors, and that process specific data such as film type was not needed.

During settlement negotiations, the SIA submitted a response to questions posed by EPA in a document entitled: *“Issues to be Addressed and Information to be Obtained To Establish an Acceptable Stack Monitoring Method for Estimating GHG Emissions From Semiconductor Manufacture” (June 17, 2011)*. In that document, it was statistically proven that usage data directly correlated with stack emissions data; moreover, the data analysis demonstrated that emissions factors were insensitive to product mix including the transition over a succession of technology nodes (eg., 130 nm → 32 nm) (p.5-6). These findings further demonstrate reporting of technology data such as linewidth and technology node is not required and should not be added as a data element.

3. EPA is Seeking Information Irrelevant in Determining Accurate DRE Factors

The process and device technology information required to be submitted with DRE data (film type being manufactured, substrate type, linewidth or technology node, process type or subtype, utilization rates measured) is not relevant to characterize abatement performance and is not typically collected when performing abatement DRE testing nor

is it required to be collected under the EPA DRE Protocol. Process data is not required under EPA's DRE Protocol Methods 1 and 2.

4. Reporting Cost, Complexity, and Burden and the Disclosure of CBI

In addition to being irrelevant to ensure the accuracy of the emissions factors, the new information being sought raises a number of cost, burden, and confidentiality issues. The industry considers product and technology information to be confidential business information. Data EPA has added is specific to products and technology and would be considered CBI.

Certain of the proposed data requirements – such as film type being manufactured, technology node and linewidth – move in the direction of recipe specific emission factors that were the problem with the original Subpart I and resulted in SIA's petition for reconsideration and EPA's grant of our petition. SIA objected to recipe specific testing several years ago because of technical infeasibility, high cost of compliance, and the disclosure of valuable intellectual property. The EPA proposal gives rise to these same concerns.

EPA contends that linewidth or technology data are not confidential because this data is publicly available in the World Fab Forecast. This database is compiled from publicly available information, which may or may not be accurate, and has not necessarily been verified by the companies. Disclosing linewidth or technology node with a specific emissions characterization data set threatens the disclosure of intellectual property.

Proposed Changes to Equation I-24

EPA proposes various changes to Equation I-24, including revision of Equation I-24 and the addition of Equation I-24B for stack testing at semiconductor fabs. This new equation requires that calculations using the default emission factor method to make adjustments for variations in the usage and performance of abatement.

In its current form, the stack test method is difficult to use, especially for facilities with abatement installed; thus, to date no fabs have used the stack test method to report annual emissions. The proposed changes make stack testing even more involved and effectively requires users of the stack method to employ both the stack testing procedures as well as the emission factor method. Stack testing should serve as an independent alternative. If this change is implemented, any changes to the default emissions factors will now change the emissions of a facility that performs stack testing. This may impose only a limited amount of additional work, but this ignores that the use of the stack method involves considerably more effort overall and investment than the emission factor method. In proposing this revision, EPA diminishes even further any incentive for fabs to conduct direct measurements of GHG emissions. Additionally, EPA provides no data that demonstrates the added complexity and cost will result in a more accurate emissions estimate. SIA strongly supports the inclusion of stack testing as an optional means of reporting emissions from fabs, but we urge EPA

to work to make this option simpler to implement instead of proposing changes that make this method even more complex and less desirable as a reporting option.

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SIA appreciates the opportunity to comment on this proposal. For more assistance on this matter, please contact David Isaacs at 202-446-1709 or disaacs@semiconductors.org.