



NICHOLAS INSTITUTE REPORT



Size Thresholds for Greenhouse Gas Regulation

Who Would Be Affected by a 25,000-ton CO₂ Emissions Rule?

Freyr Sverrisson, Independent Consultant

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This report was made possible by a grant from Environmental Defense Fund. It serves as an update to the Nicholas Institute Policy Brief, “Size Thresholds for Greenhouse Gas Regulation: Who Would Be Affected by a 10,000-ton CO₂ Emissions Rule?” first published in 2007, which was intended to identify the impact of a potential 10,000-ton-per-year CO₂ threshold on three sectors of the U.S. economy, with particular attention given to the manufacturing sector. To extend our previous analysis, this report uses a 25,000-ton requirement to identify at a national level who is in, and who is out, of regulation in three U.S. sectors: electric power plants, commercial buildings, and manufacturing industries.

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Executive Summary

This report was first published as a policy brief in 2007. The objective at that time was to identify the impact of a potential 10,000-ton-per-year CO₂ threshold on three sectors of the U.S. economy, with particular attention given to the manufacturing sector. This update of the brief presents the same information, presented now in light of a threshold set at 25,000 tons per year.

One of the first questions posed when new regulations of any kind are being considered is, who is regulated? Lack of clarity on the point of regulation can lead to incorrect assumptions and policy decisions. Opponents of action on climate change have warned that jobs might be lost to a cap-and-trade system that encompasses small businesses. This concern is especially prevalent in the manufacturing sector, where most facilities currently do not measure emissions, and are unsure how they would be affected by a cap-and-trade system. It is critical, therefore, to understand what type and size of business entities might be subject to regulation, both to allay concerns and design policy to assist those most affected.

Various legislative proposals have sought to target only “large emitters,” commonly measured as those facilities that emit at least 25,000 metric tons per year of carbon dioxide or its greenhouse gas equivalent.¹ This report uses a 25,000-ton requirement to identify who is in, and who is out, of regulation in three U.S. sectors. Data on fuel consumption per employee used in this report to derive total annual CO₂ emissions per employee are from the latest Manufacturing Energy Consumption Survey (MECS) from the Energy Information Administration (EIA). Data on the number of facilities and employees in each industry, used with fuel consumption data to estimate total annual emissions per facility, are from the U.S. Census Bureau’s Economic Census. It is important to note that because the available data deal only with fuel consumption, emissions of other greenhouse gas emissions from manufacturing are not counted in this analysis. There are certain industries, such as cement production and semiconductor manufacturing, that have significant emissions of CO₂ and/or other greenhouse gases from non-energy processes. Such industrial-process emissions, which can be very significant in some industries, are not included in this analysis, but they could affect which industries would exceed the 25,000-ton threshold.

In the electric power sector, most of the CO₂ emissions (99.78%) come from only half of the plants (51.8%).² Large power plants, and those that use fossil fuel for generation, are almost certain to be covered under a 25,000-ton regulation; small generating units used intermittently may be exempt. In the commercial sector, farms and commercial buildings generally would be outside the scope of a program that sets the threshold at 25,000 tons per year, except for a few very large universities and hospitals that run large boilers for central heat.

The manufacturing sector, given the variety of facility sizes and industry processes, presents an interesting story. The general rule of thumb is that if the facility has a smokestack, it will probably be required to account for its emissions under a 25,000-ton rule. If the facility has fewer than 50 employees, and no smokestack, it will be virtually guaranteed safe passage around any regulation, regardless of the industry. The vast majority of manufacturing industries are not expected to cross a 25,000-ton threshold until the employee count is in the hundreds, and for a large number of industries, that threshold is never crossed.

Key findings

- The **electric power sector** largely **WILL** be included in a 25,000-ton CO₂ regulation
- **Farms and commercial buildings** largely **WILL NOT** be included in a 25,000-ton CO₂ regulation
- For the majority of **individual manufacturing industries**, **LESS THAN 10%** of facilities in any single

¹ The terms *ton* and *metric ton* (abbreviated *t*) are used interchangeably in this report (1 ton = 1,000 kg = 2,204.62 lbs).

² Based on U.S. Department of Energy and Environmental Protection Agency data from 2005. Many of the plants emitting less than 25,000 tons of CO₂ were either not operating in 2005 or operating at an uncharacteristically low level. The results shown here represent actual unit emissions in the year 2005, and not necessarily typical emissions for each unit.

industry will be included in a 25,000-ton CO₂ regulation, and only **1.3% of facilities across all industries** would be affected

Table 1. The scope of a 25,000-ton threshold in manufacturing.

Total number of facilities in 2002	Annual CO ₂ emissions (1,000 tons)	Number of facilities above threshold	Percentage of facilities above threshold	CO ₂ reported (1,000 tons) by threshold facilities	Percentage of industry CO ₂ emissions from threshold facilities
350,075	851,677	4,724	1.3%	702,907	82.5%

Using EIA manufacturing consumption data and Census Bureau facility size information, this report confirms that a 25,000-ton threshold for inclusion in an emissions cap would have covered approximately 83% of manufacturing sector emissions in 2002 while affecting only 1.3% of manufacturing facilities (Table 1). The findings indicate that a 25,000-ton threshold would apply mainly to large factories and facilities with a large number of employees, and that as the threshold number of employees increases even fewer facilities reach the required emission level to be directly affected by climate regulation. For example, in the sub-sectors of pharmaceuticals, textile product mills and most food manufacture, for which we estimate a threshold facility size of 1,000 employees, less than 5% of facilities would fall under regulation. For a few very energy-intensive industries, however, such as oil refining and lime production, virtually all facilities would be affected (Table 2).

Table 2. At what size may a manufacturing facility reach a 25,000-ton threshold?³

Size of facility (employee numbers)	Examples of industries affected	Percentage of facilities affected
No facilities expected to be regulated	Printing, plastics and rubber products, steel products from purchased steel, fabricated metals, machinery, computers and electronics, electrical equipment and components, appliances, transportation equipment, furniture, wood products, apparel, and leather goods.	0%
>1,000	Pharmaceuticals and medicine, aluminum foundries, textile product mills, most food manufacture, including fruit and vegetable canning.	Less than 5% (ranges from .1% to 3.4%)
>500	Beverages, textile mills.	Less than 5% (ranges from 1.3% to 2.1%)
>250	Tobacco, paper (except mills), glass and glass products other than flat glass, iron and steel mills, nonferrous metals, and iron foundries.	Less than 30% (ranges from 6.3% to 28.4%)
>100	Paper mills; sugar production; primary production of various chemicals such as plastics, resins, and synthetic rubber; phosphatic fertilizer; flat glass; and mineral wool.	Less than 90% (ranges from 6.6% to 86.1%)
>50	Petroleum (except refineries), various chemicals such as basic organics and inorganics, and ferroalloys.	Less than 90% (ranges from 18.7% to 80.0%)
All facilities regulated	Petroleum refineries and lime manufacturing.	100%

For the majority of manufacturing industries, less than 10% of facilities, if any, would be expected to fall under a 25,000-ton emission regulation. Overall, a cap-and-trade system that implements a 25,000-ton threshold for participation will primarily apply to large industry and the electric power sector, and will not affect small and medium-sized businesses in the United States.

³ See Table 5 in main text for individual percentages for each industry.

1. Introduction

Various legislative proposals to address climate change through a market-based cap-and-trade system have sought to target only “large emitters,” generating maximum environmental benefits while minimizing the cost to businesses. In Washington, this has come to mean a policy that affects only those facilities that emit at least 25,000 metric tons per year of carbon dioxide or its greenhouse gas equivalent. The presumption is that this threshold essentially defines a large emitter, and that it may represent the optimal balance between the scope of a cap-and-trade system and the potential burden such a system may place on business owners. This is not only a matter of conceiving efficient public policy. Opponents of action on climate change have warned that jobs might be lost to a cap-and-trade system that regulates small businesses. Therefore, it is critical to understand what type and size of business entities might be affected, both to allay concerns and design policy to assist those who would experience the most impact.

A study published in 2003 estimated the scope of a 10,000-ton threshold on broad categories of manufacturing, and provided similar estimates for the electric power sector, landfills, commercial buildings, and agriculture.⁴ The study found that this threshold would account for virtually all greenhouse gas emissions from the power sector and landfills, encompassing the majority of emitters in those sectors, while effectively relieving commercial buildings and agriculture from participation altogether, because of generally low, diffuse sector emissions. Small variations in the threshold level would not change this outcome.

The manufacturing industry, however, is a different story. Manufacturing facilities represent a significant portion of greenhouse gas emissions because of their energy use—yet they also come in all shapes and sizes, from steel mills employing thousands of people to family firms of just a few individuals. Using 1998 data, the 2003 study concluded that a 10,000-ton threshold would affect only 2.1% of manufacturing facilities while accounting for 80% of fuel-related greenhouse gas emissions from industry.⁵

The original version of this policy brief, using 2004 data, confirmed those findings and showed that 85% of fuel-related CO₂ emissions from industry would be reported by 2.3% of manufacturing facilities. This updated brief asks, Which manufacturing sector businesses would be regulated under a national, economy-wide cap-and-trade program for carbon dioxide emissions that would specifically target large emitters with a 25,000-ton threshold?

As before, this report identifies the effect on various sub-sectors of the manufacturing industry and establishes what type and size of facility might be included in a cap-and-trade regime. The findings indicate that a cap-and-trade system that implements a 25,000-ton threshold for participation would focus on large industry, and would not impact the majority of small and medium-sized businesses. It is important to note that because the available data deal only with fuel consumption, emissions of other greenhouse gas emissions from manufacturing are not counted in this analysis. There are certain industries, such as cement production and semiconductor manufacturing, that have significant emissions of CO₂ and/or other greenhouse gases from non-energy processes. Such industrial-process emissions, which can be very significant in some industries, are not included in this analysis, but they could affect which industries would exceed the 25,000-ton threshold.

The report begins with a summary of the results from different sectors and industries, followed by examples of individual facilities from nine different states. Section 4 discusses the data and methodology used in the emissions analysis, and section 5 concludes with the full results of the analysis, organized by industry.

⁴ West and Peña, 2003.

⁵ Ibid.

A note on non-CO₂ and other process emissions

The estimated thresholds reported here are based only on carbon dioxide emissions from fossil fuel combustion. The available data does not allow us to estimate emissions of other greenhouse gases or noncombustion emissions of CO₂. There are certain industries, such as semiconductor manufacturing and aluminum production, that have significant emissions of both CO₂ and other greenhouse gases from non-energy processes that sometimes involve non-energy use of fossil fuels as industrial feedstocks. Such industrial process emissions, which can be very significant in these industries, are not included in this analysis.

2. Summary of Results

2.01. Sector summaries

2.01.01. Electric power plants

One half of power plants that use fossil fuels to generate electricity emit more than 25,000 tons of CO₂ per year. Power plants are concentrated on the high end of the spectrum of CO₂ emissions per facility. For example, a small coal-fired unit of 25-megawatt (MW) generating capacity would exceed 25,000 tons of CO₂ emissions in 45 days at full output.⁶ However, there is a large number of even smaller generating units around the country, often used only intermittently, that are not likely to emit more than 25,000 tons of CO₂. Data gathered by the U.S. Department of Energy and the Environmental Protection Agency indicate that in 2005, some 2,834 generating plants in the country used fossil fuels (coal, gas, or oil) as their primary fuel.⁷ Almost 52% of these plants emitted more than 25,000 metric tons of CO₂ in that year. The emissions were so concentrated among the larger power plants that these 1,468 plants accounted for 99.78% of CO₂ emissions from the fossil fuel power sector.⁸

Table 3. The scope of a 25,000-ton threshold in power generation.

Total number of fossil fuel-generating plants in 2005	Total annual CO ₂ emissions (million tons)	Number of plants above 25,000 tons	Percentage of plants above 25,000 tons	CO ₂ reported from threshold plants (million tons)	Percentage of generation CO ₂ emissions from threshold plants
2,834	2,667	1,468	51.8%	2,661	99.78%

Source: U.S. EPA, 2005 data from eGRID2007, Version 1.1, Plant File.

2.01.02. Farms and commercial buildings

On the other end of the spectrum we find most farms and commercial buildings, which generally have no large boilers or other large sources of fossil fuel combustion. The exceptions are some large universities and hospitals that run large boilers for central heat. A 25,000-ton threshold would not affect the vast majority of farms, and the same is true for commercial buildings that are not centers of large-scale manufacturing.

2.01.03. Manufacturing

In the manufacturing sector, the bulk of CO₂ emissions come from a very small portion of all manufacturing facilities, but due to the large number of facilities and differences across sub-sectors of industry, there is reason to take a closer look. The manufacturing sector spans the entire spectrum from very low to very high emissions per facility, and is the area with the greatest need for clarification on who is, and who is not, affected by a 25,000-ton threshold. The rest of this report focuses on identifying the relative impact of a CO₂ regulation on manufacturing facilities in various sub-sectors of industry.

This report confirms that a 25,000-ton threshold for inclusion in an emissions cap would have covered approximately 83% of manufacturing sector emissions in 2002 while affecting only 1.3% of manufacturing facilities, mostly large factories and facilities with a large number of employees (Table 4).

⁶ Assuming heat rate of 10,000 Btu per kWh: (250 mill. Btu/hour) x (25.74 kg carbon per mill. Btu) x (44/12 mass ratio CO₂/C) = 23.6 metric tons/hour. 10,000 tons/23.6 tons per hour/24 hours per day = 17.7 days.

⁷ Here, a power plant refers to a single plant that may be, and often is, made up of several boilers and several generators of varying capacity. A plant as a whole may exceed the 25,000-ton threshold while some, or all, generating units of the plant may remain within the threshold individually.

⁸ Many of the plants emitting less than 25,000 tons of CO₂ were either not operating in 2005 or operating at an uncharacteristically low level. The results shown here represent actual unit emissions in the year 2005, and not necessarily typical emissions for each unit.

Table 4. The scope of a 25,000-ton threshold in manufacturing.

Total number of facilities in 2002	Annual CO ₂ emissions (1,000 tons)	Number of facilities above threshold	Percentage of facilities above threshold	CO ₂ reported (1,000 tons) by threshold facilities	Percentage of industry CO ₂ emissions from threshold facilities
350,075	851,677	4,724	1.3%	702,907	82.5%

2.02. Industry summaries

Table 5 provides an overview of results for all manufacturing industries covered in this report, listing industry designations, the number of facilities and total CO₂ emissions in each industry, size thresholds for regulation, percentages of facilities regulated and the share of total emissions reported for each industry. A more detailed discussion of thresholds for each industry is provided in section 3.

Table 5. All available results for a 25,000-ton threshold.

NAICS Code	Industry	Total number of facilities	Annual CO ₂ emissions (1,000 tons)	Size threshold for regulation (employees)	Percentage of facilities regulated	Percentage of emissions regulated
311	Food	27,898	50,890	>1,000	0.9%	45%
311221	Wet corn milling	61	14,656	>50	54.1%	99%
[31131X]	"Sugar"	87	4,984	>100	50.6%	92%
311421	Fruit & vegetable canning	782	2,062	>1,000	0.4%	11%
312	Beverage and tobacco	3,017	4,571	>500	1.9%	59%
[3121Xx]	"Beverages"	2,903	3,336	>500	1.3%	51%
[3122Xx]	"Tobacco"	114	1,235	>250	18.4%	87%
313	Textile mills	3,919	6,590	>500	2.1%	38%
314	Textile product mills	7,270	1,759	>1,000	0.1%	13%
315	Apparel	13,041	913	None	0.0%	0%
316	Leather and allied products	1,530	212	None	0.0%	0%
321	Wood products	17,178	4,244	None	0.0%	0%
321113	Sawmills	3,807	959	None	0.0%	0%
[32121X]	"Veneer, plywood, etc."	1,916	2,260	None	0.0%	0%
[3219Xx]	"Other wood products"	10,940	793	None	0.0%	0%
322	Paper	5,501	58,475	>250	7.0%	86%
322110	Pulp mills	32	1,703	>100	68.8%	99%
323	Printing and related activities	37,532	2,504	None	0.0%	0%
324	Petroleum*	2,262	280,200	>50	18.7%	98%
324110	Petroleum refineries	198	254,600	All	100.0%	100%
325	Chemicals*	13,189	211,600	>100	14.6%	87%
325182	Carbon black mfg	25	4,900	>50	80.0%	100%
325188	All other basic inorganic chemicals	617	7,200	>50	22.0%	88%
325192	Cyclic crude & intermediate mfg	39	2,800	>100	33.3%	93%
325199	All other basic organic chemicals†	688	65,700	>50	42.3%	98%
325211	Primary production of plastics material & resin	688	49,400	>100	23.1%	94%
325212	Synthetic rubber mfg	157	2,400	>100	17.2%	91%

Size Thresholds for Greenhouse Gas Regulation: Who Would Be Affected by a 25,000-ton CO₂ Emissions Rule?

NAICS Code	Industry	Total number of facilities	Annual CO ₂ emissions (1,000 tons)	Size threshold for regulation (employees)	Percentage of facilities regulated	Percentage of emissions regulated
325311	Nitrogenous fertilizer mfg [§]	143	10,156	>50	18.9%	98%
325312	Phosphatic fertilizer mfg	44	1,900	>100	40.9%	97%
[32541X]	"Pharmaceuticals and medicines"	1,800	4,516	>1,000	2.5%	37%
325412	Pharmaceutical preparation	901	3,202	>1,000	3.4%	50%
326	Plastics and rubber products	15,487	7,678	None	0.0%	0%
327	Nonmetallic mineral products	16,653	63,907	>100	6.6%	92%
[32721X]	"Glass and glass products"	2,261	8,128	>250	6.5%	74%
327211	Flat glass mfg	36	2,759	>100	86.1%	99%
327310	Cement mfg [‡]	246	30,580	>50	48.8%	92%
327410	Lime mfg	77	9,461	All	100.0%	100%
327993	Mineral wool mfg	304	2,139	>100	17.4%	89%
331	Primary metals	5,188	119,000	>250	9.1%	89%
331111	Iron & steel mills	373	91,000	>250	28.4%	98%
331112	Ferroalloys	24	800	>50	50.0%	89%
[3312Xx]	"Steel products from purchased steel"	666	1,273	None	0.0%	0%
[33131X]	"Alumina and aluminum" ^{**}	592	11,300	>250	13.2%	89%
[3314Xx]	"Nonferrous metals, except aluminum"	1,021	4,300	>250	6.3%	59%
[3315Xx]	"Foundries"	2,512	7,600	>500	4.1%	51%
331511	Iron foundries	619	4,900	>250	11.1%	68%
331521	Aluminum die-casting foundries	295	849	>1,000	0.7%	25%
331524	Aluminum foundries, except die-casting	542	743	>1,000	0.2%	8%
332	Fabricated metals	62,176	11,811	None	0.0%	0%
333	Machinery	28,239	4,717	None	0.0%	0%
334	Computers and electronics	15,813	3,601	None	0.0%	0%
335	Electrical equipment, appliances,	6,481	2,948	None	0.0%	0%
336	Transportation equipment	12,579	12,738	None	0.0%	0%
337	Furniture and related products	22,524	1,557	None	0.0%	0%
339	Miscellaneous	32,598	1,761	None	0.0%	0%
	Total manufacturing	350,075	851,677		1.3%	82.5%

* The production of many petrochemicals results in substantial nonfuel process emissions of methane (CH₄), which are not reflected in this table (see section 4).

† The production of organic chemicals may be associated with substantial nonfuel greenhouse gas emissions. Specifically, the adipic acid production process emits nitrous oxide (N₂O), which is not reflected in this table (see section 4).

‡ Virtually all cement manufacturing would be expected to exceed 25,000 tons per year of CO₂ emissions due to high process emissions, which are not reflected in this table (see section 4).

§ Nitric acid production is a potent source of nitrous oxide (N₂O) emissions, which are not reflected in this table (see section 4).

** Primary aluminum production (NAICS 331312) results in substantial process emissions of carbon dioxide (CO₂) and sulfur hexafluoride (SF₆), which are not reflected in this table (see section 4).

Some generalizations can be derived from this manufacturing analysis to highlight which industries are likely to be affected by a 25,000-ton emissions regulation, and which are not. For example, pharmaceutical preparation manufacturers (NAICS Code 325412) are largely unaffected. With over 900 facilities throughout the U.S. in the year 2002, only 31 plants would have been expected to fall under a 25,000-ton CO₂ regulation requirement. Those 31 facilities represent 50% of that industry’s total emissions.

Flat glass manufacturing, on the other hand, is a relatively small yet energy-intensive industry which will be affected by a 25,000-ton CO₂ policy. There were 36 flat glass facilities in the United States in 2002, and the 31 plants that had more than 100 employees would have been expected to exceed 25,000 tons of CO₂ emissions per year. These 31 plants account for 99% of the industry’s emissions.

Table 6 shows the percentage of each industry that is expected to be affected by a 25,000-ton requirement. A more complete description of each industry is included in section 5. A breakdown of facilities by 14 sample states (Alaska, Arizona, Arkansas, Indiana, Michigan, Missouri, Montana, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, Virginia, and West Virginia) is included in section 3.

Table 6. Percentage of facilities expected to fall under a 25,000-ton emission regulation.

No facilities	<1% of facilities	1%–5% of facilities	5%–10% of facilities	10%–30% of facilities	30%–60% of facilities	60%–90% of facilities	All facilities
Apparel							
Leather and allied products				Iron foundries			
Wood products				Alumina and aluminum			
Sawmills				Synthetic rubber	Cyclic crude & intermediate		
Printing and related activities			Nonferrous metals, except aluminum	Mineral wool	Phosphatic fertilizer		
Plastics and rubber products	Textile product mills	Beverages		Tobacco	Basic organic chemical	Pulp mills	Petroleum refineries
Steel products from purchased steel	Aluminum foundries	Textile mills	Paper, other than pulp mills	Nitrogenous fertilizer	Cement mfg	Carbon black	
Fabricated metals	Fruit & vegetable canning	Pharmaceuticals and medicine	Glass products other than flat glass	Basic inorganic chemicals	Ferroalloys	Flat glass	Lime
Machinery	Food			Primary production of plastics material & resin	Sugar		
Computers and electronics				Iron & steel mills	Wet corn milling		
Electrical equipment and appliances							
Transportation equipment							
Furniture							

2.03. CO₂ emissions are concentrated among largest facilities

The bulk of emissions are generally concentrated with the very largest manufacturing facilities in each industry. To fully explain why emissions are so heavily concentrated, at 83% among only 1.3% of facilities, it is helpful to look at the relationship among some variables that affect this outcome:

1. The number of employees per facility;
2. Energy use per employee, which is the product of:
 - 2a. Energy use per unit of production (energy productivity);
 - 2b. Unit production per employee (manufacturing productivity);
3. Carbon content of the energy used on-site (not purchased electricity).

Clearly, the consumption of energy in any given industry grows with the size of operations. Greater employee numbers generally mean greater emissions. However, there are more specific reasons for facility emissions to be higher at large facilities. Increased facility size often allows for improved productivity in manufacturing, which means higher economic output per unit of energy (variable 2a declines) and higher economic output per employee (variable 2b rises). If these variables moved proportionately in opposite directions, the energy use per employee would be constant, and a larger facility would not necessarily contribute proportionately more emissions.

Large facilities tend to capitalize on increased efficiency to increase production, however, increasing their total output. The competitive advantage of combined improvements in production efficiency (increased output per worker) and energy efficiency (causing lower cost per unit of output) normally lead to accelerated production. As a result, relative to smaller facilities, emissions per unit of output are lower, but emissions per employee will often be much higher because of the relative acceleration of production. In other words, the additional emissions from increased output tends to exceed reductions in emissions from increased unit efficiency. To further augment the contrast, very large manufacturing facilities tend to be few in numbers compared to the large number of smaller facilities. The combined overall effect is the concentration of industry emissions in the hands of a few large facilities.

Another reason for CO₂ emissions to be concentrated on large manufacturing facilities lies in the nature of industries. Most CO₂ emissions in industry come from the combustion of fossil fuels, which is the only source quantified in this report. This relates to the variable of carbon content of energy used on-site (variable 3 above). Most small manufacturers simply do not burn vast amounts of fuel on-site (although electricity consumption can be substantial). By the time a manufacturing facility is using very large amounts of coal, oil, and natural gas, it tends to be a large facility. A simple way to conceive of the difference is as follows: If the facility has a smokestack, it will probably be required to account for its emissions under a 25,000-ton rule. If the facility has fewer than 50 employees, and no smokestack, it will be virtually guaranteed not to be regulated, regardless of what the industry may be. The vast majority of manufacturing industries are not expected to cross a 25,000-ton threshold until the employee count is in the hundreds, and for a large number of industries, that threshold is never crossed.

Table 7 reveals how a 25,000-ton threshold would primarily target the largest emitters, whether those are energy-intensive industries that are affected regardless of size, such as refineries, or less energy-intensive industries that are only affected once their physical and economic scale has become quite significant, such as transportation manufacturers. These values are broad approximations based on average emissions among facilities within each of the indicated size ranges.

Table 7. At what size may a facility reach a 25,000-ton threshold?

Size of facility (employee numbers)	Examples of industries affected	Percentage of facilities affected
No facilities expected to be regulated	Printing, plastics and rubber products, steel products from purchased steel, fabricated metals, machinery, computers and electronics, electrical equipment and components, appliances, transportation equipment, furniture, wood products, apparel, and leather goods.	0%
>1,000	Pharmaceuticals and medicine, aluminum foundries, textile product mills, most food manufacture, including fruit and vegetable canning.	Less than 5% (ranges from .1% to 3.4%)
>500	Beverages, textile mills.	Less than 5% (ranges from 1.3% to 2.1%)
>250	Tobacco, paper (except mills), glass and glass products other than flat glass, iron and steel mills, nonferrous metals, and iron foundries.	Less than 30% (ranges from 6.3% to 28.4%)
>100	Paper mills; sugar production; primary production of various chemicals such as plastics, resins, and synthetic rubber; phosphatic fertilizer; flat glass; and mineral wool.	Less than 90% (ranges from 6.6% to 86.1%)
>50	Petroleum (except refineries), various chemicals such as basic organics and inorganics, and ferroalloys.	Less than 90% (ranges from 18.7% to 80.0%)
All facilities regulated	Petroleum refineries and lime manufacturing.	100%

3. Examples of Manufacturing Facilities in 14 States

This section provides examples of facilities both above and below the estimated threshold for each industry in 14 states. Because these thresholds are not based on directly observed emissions, there is some uncertainty in listing which specific facilities will be included in the cap. Furthermore, because facility information tends to be listed in size ranges (e.g. 100–250 employees), it is often difficult to know how close or far a particular facility is from the threshold with precision. Therefore, in the tables below, facilities that fall close to the threshold are listed in italics. For example, if the threshold is 250 employees, and a facility is reported as having 250–499 employees, it would be listed as a facility estimated to be above the threshold, but it would be shown in italics. If, however, the facility is reported as having 100–249 employees, it would be listed as a facility estimated to be below the threshold, but it would also be shown in italics. All other facilities are assumed to be either well above or below the threshold.

Table 8. Example facilities from 14 states with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311221	Wet corn milling	>50	<i>Tate and Lyle</i> <i>Van Buren, Arkansas</i>	
			Abbitt's Mill Inc. Williamston, North Carolina	Corn Products Winston-Salem, North Carolina
				Cargill Corn Milling Inc. Dayton, Ohio
			<i>Tate and Lyle</i> <i>Morrisville, Pennsylvania</i>	
311421	Fruit & vegetable canning	>1,000	<i>North Pacific Processors Inc.</i> <i>Cordova, Alaska</i>	
			Sun Orchard Inc. Van Buren, Arkansas	<i>Tyson Foods, Inc.</i> <i>Green Forest, Arkansas</i>
			Morgan Foods Inc. Austin, Indiana	
			Birdseye Foods Fennville, Michigan	
			Jasper Products Joplin, Missouri	
			TW Garner Food Co. Winston-Salem, North Carolina	
			Herman Pickle Co. Garrettsville, Ohio	
			Knouse Foods Biglerville, Pennsylvania	<i>Heinz North America</i> <i>Pittsburgh, Pennsylvania</i>
			Wood Brothers Inc. West Columbia, South Carolina	
			H.B. Hunter Co. Norfolk, Virginia	
Knouse Foods Cooperative, Inc. Inwood, West Virginia				

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[31131x]	"Sugar"	>100	Michigan Sugar Co. Au Gres, Michigan	Michigan Sugar Co. Bay City, Michigan
			Chase General Corporation Saint Joseph, Missouri	
			Western Sugar Co. Custer, Montana	Sidney Sugars Inc. Sidney, Montana
			Amstar Corporation Charlotte, North Carolina	
			American Crystal Sugar Cavalier, North Dakota	American Crystal Sugar Drayton, North Dakota
			A&A Distributors Inc. Cleveland, Ohio	<i>American Sugar Refining Cleveland, Ohio</i>
			Holl's Chocolate Inc. Vienna, West Virginia	
[3121xx]	"Beverages"	>500	Alaskan Brewing Co. Juneau, Alaska	
			Coca-Cola Bottling Co. Flagstaff, Arizona	Coca-Cola Bottling Co. Tempe, Arizona
			Pepsi Bottling Group Fort Smith, Arkansas	
			Pepsi Americas Inc. Muncie, Indiana	Coca-Cola Bottling Co. Indianapolis, Indiana
			Coca-Cola Bottling Co. Kalamazoo, Michigan	Stroh Companies Inc. Detroit, Michigan
			Arctic Ice Inc. St. Louis, Missouri	<i>Pepsi Americas Inc. St. Louis, Missouri</i>
			Pepsi Bottling Group Butte, Montana	
			Coca-Cola Bottling Co. Raleigh, North Carolina	Coca-Cola Bottling Co. Charlotte, North Carolina
			Pepsi Bottling Group Dickinson, North Dakota	
			Coca-Cola Bottling Co. Twinsburg, Ohio	<i>Anheuser-Busch Co. Columbus, Ohio</i>
			Coca-Cola Bottling Co. Pottsville, Pennsylvania	<i>Coca-Cola Bottling Co. Philadelphia, Pennsylvania</i>
			Coca-Cola Bottling Co. Rock Hill, South Carolina	
			Dr. Pepper Bottling Co. Pulaski, Virginia	
Pepsi Bottling Group Nitro, West Virginia				

Size Thresholds for Greenhouse Gas Regulation: Who Would Be Affected by a 25,000-ton CO₂ Emissions Rule?

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[3122xx]	"Tobacco"	>250	<i>RJ Reynolds Tobacco Co.</i> <i>Winston-Salem, North Carolina</i>	
			U.S. Smokeless Tobacco Weirton, West Virginia	
313	Textile mills	>500	BEI Sportswear Inc. Tempe, Arizona	
			Fiber Bond Corp. Trail Creek, Indiana	
			Guildford Mills Inc. Madison Heights, Michigan	
			RM Coco Inc. Cape Girardeau, Missouri	
			Gray Wolf Trading Co. Polson, Montana	
			Glen Raven Inc. Burlington, North Carolina	
			Drapery Stitch Delphos, Ohio	
			American Silk Mills Hudson, Pennsylvania	
			Milliken and Company Spartanburg, South Carolina	Swift Galey Society Hill, South Carolina
			Jefferson Mills Pulaski, Virginia	<i>National Textile</i> <i>Galax, Virginia</i>
			Edgewood Country Club Charleston, West Virginia	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
314	Textile product mills	>1,000	Nomar LLC Homer, Alaska	
			Arizona Tent and Events LLC Phoenix, Arizona	
			White Bag, Inc. North Little Rock, Arkansas	
			Anchor Industries Evansville, Indiana	
			Scott Group Inc. Grand Rapids, Michigan	
			CDI Inc. Cape Girardeau, Missouri	
			Sutton's Sportswear Co. Billings, Montana	
			RL Stowe Mills Belmont, North Carolina	
			American Pacific Enterprises Grove City, Ohio	
			Fabtex Inc. Danville, Pennsylvania	
			Lugoff Industrial Textile Lugoff, South Carolina	
			Dixie Fibertex Co. Richmond, Virginia	
			Palmer Smith Co. Farmington, West Virginia	
315	Apparel	None	David Green Master Furrier Anchorage, Alaska	
			Fruit of the Loom, Inc. Jonesboro, Arkansas	
			Berne Apparel Corporation New Haven, Indiana	
			Freshwater Apparel Bolivar, Missouri	
			Montana Knits, Inc. Helena, Montana	
			Interstate Narrow Fabrics Inc. Haw River, North Carolina	
			Omnova Solutions, Inc. Akron, Ohio	
			New Morton Shirt Co. Masontown, West Virginia	
Arrowhead Textile Co. Spartanburg, South Carolina				

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NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
316	Leather and allied products	None	Frontier Tanning Co. Anchorage, Alaska	
			Wolverine Procurement, Inc. Jonesboro, Arkansas	
			Sunrise Tannery Kansas City, Missouri	
			Kinro Manufacturing Elkhart, Indiana	
			Montana Leather Co. Billings, Montana	
			D&W Leather Products Co. Gastonia, North Carolina	
			Dacotah Leather Co. Grand Forks, North Dakota	
			John King Leather Co. Columbia, South Carolina	
			Green Valley Manufacturing Cameron, West Virginia	
321113	Sawmills	None	Pacific Log and Lumber Ltd. Ketchikan, Alaska	
			Reidhead Brothers Lumber Mill Nutrioso, Arizona	
			Adkins Sawmill Mitchell, Indiana	
			Hardwoods of Michigan, Inc. Clinton, Michigan	
			Horse Creek Hardwoods Lamar, Missouri	
			Four Corners Pine LLC Trout Creek, Montana	
			Sunrise Sawmill Asheville, North Carolina	
			Frieds Saw Mill Inc. Mandan, North Dakota	
			J. McCoy Lumber Co. Ltd. Peebles, Ohio	
			Bradford Forest Products Bradford, Pennsylvania	
			Dempsey Wood Products Inc. Rowesville, South Carolina	
			Ferguson Land and Lumber Co. Rocky Mount, Virginia	
Bowling Timber and Logging Liberty, West Virginia				

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[32121x]	"Veneer, plywood, etc."	None	Fairbanks Truss Co. Fairbanks, Alaska	
			R&K Lumber Gilbert, Arizona	
			Davidson Plyforms Inc. Grand Rapids, Michigan	
			Affordable Truss Exeter, Missouri	
			Georgia-Pacific Plywood Plant Dudley, North Carolina	
			Stark Truss Co. Inc. Washington Court House, Ohio	
			Amron Building Components Bickmore, West Virginia	
[3219xx]	"Other wood products"	None	Alaskan Wood Moulding Anchorage, Alaska	
			Atrium Windows and Doors Tolleson, Arizona	
			Handy Home Products Monroe, Michigan	
			Cox and Son Lumber Lamar, Missouri	
			Alpine Log Homes Victor, Montana	
			Pinnacle Builders Inc. Waynesville, North Carolina	
			Ohio Valley Lumber Piketon, Ohio	
Freedom Homes Nitro, West Virginia				

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
322110	Pulp mills	>100	Greenbay Packaging Inc. Heber Springs, Arkansas	Domtar Industries Ashdown, Arkansas
			Forest Resources Quinnesec, Michigan	New Page Corporation Escanaba, Michigan
			Verso Paper Chesterfield, Missouri	AJM Packaging Corporation Joplin, Missouri
			Brawley Timber Co. Murphy, North Carolina	Blue Ridge Paper Products Canton, North Carolina
			B&B Paper Converters Inc. Cleveland, Ohio	Mead Westvaco Corporation Chillicothe, Ohio
			Metzler Forest Products Woodland, Pennsylvania	Domtar Industries Johnsonburg, Pennsylvania
			Tyson Pulpwood Georgetown, South Carolina	<i>Abitibi Bowater Inc.</i> <i>Greenville, South Carolina</i>
			Gladys Timber Products Gladys, Virginia	
			US Tag and Ticket Huntington, West Virginia	
			323	Printing and related activities
Alaska Litho Inc. Juneau, Alaska				
A-1 Graphics Muncie, Indiana				
Grandville Printing Co. Grandville, Michigan				
Four State Printing Co. Anderson, Missouri				
Advanced Litho Printing Great Falls, Montana				
Carolina Printing Raleigh, North Carolina				
Cole Papers Fargo, North Dakota				
Hopkins Printing Inc. Columbus, Ohio				
Printers Ink Summerville, South Carolina				
WV Printing Charleston, West Virginia				

Size Thresholds for Greenhouse Gas Regulation: Who Would Be Affected by a 25,000-ton CO₂ Emissions Rule?

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
324110	Petroleum refineries	All		Flint Hills Resources North Pole, Alaska
				Western Refining Inc. Tempe, Arizona
				Lion Oil Co. El Dorado, Arkansas
				Marathon Petroleum Detroit, Michigan
				Conoco Phillips Billings Refinery Billings, Montana
				Tesoro Refinery Mandan, North Dakota
				Marathon Petroleum Canton, Ohio
				Sunoco Inc. Philadelphia, Pennsylvania
				ExxonMobil Refining & Supply Fairfax, Virginia
325182	Carbon black mfg	>50	Columbian Chemicals Co. El Dorado, Arkansas	
			Occidental Chemical Corporation Pottstown, Pennsylvania	
			Azdel Inc. Forest, Virginia	
			Cabot Corporation Waverly, West Virginia	<i>Columbian Chemicals Co. Proctor, West Virginia</i>

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
325188	All other basic inorganic chemicals	>50	K Tech Inc. Hot Springs, Arkansas	Porocel Corporation Little Rock, Arkansas
			Ceres Solutions LLP Vincennes, Indiana	Curtis Dyna-fog Ltd. Westfield, Indiana
			Mead Technologies Inc. Rolla, Missouri	Mississippi Lime Co. Sainte Genevieve, Missouri
			Montana Sulphur & Chemical Co. Billings, Montana	American Chemet Corporation East Helena, Montana
			Elon Specialties Concord, North Carolina	Arclin Moncure, North Carolina
			Ohio Carbon Blank Willoughby, Ohio	Perstorp Polyols Inc. Toledo, Ohio
			Fedchem Inc. Bethlehem, Pennsylvania	BASF Corporation Erie, Pennsylvania
			Pioneer Chemicals Inc. Greenville, South Carolina	Carbide Alloys Inc. Columbia, South Carolina
			Nalco Chemical Co. Hopewell, Virginia	
			Occidental Chemical Corporation Belle, West Virginia	Chemtura Corporation Morgantown, West Virginia
325211	Plastics material & resin mfg	>100	Cytec Engineered Materials Tempe, Arizona	Guardian Fiberglass Kingman, Arizona
			Mesa Industries, Inc. Fort Smith, Arkansas	Crane Composites Jonesboro, Arkansas
			Brunk Corporation Goshen, Indiana	DSM Engineering Plastics Evansville, Indiana
			Vertex Plastics Kearney, Missouri	Presence from Innovation LLC Hazelwood, Missouri
			Rocky Mountain Plastics Whitefish, Montana	
			Polyreps Inc. Monroe, North Carolina	Clariant Corporation Charlotte, North Carolina
			Terhorst Manufacturing Co. Minot, North Dakota	
			Buckeye Polymers Inc. Lodi, Ohio	Lubrizol Advanced Materials Cleveland, Ohio
			Fiber Depot Inc. Harrisville, Pennsylvania	Nova Chemicals Inc. Coraopolis, Pennsylvania
			Diamond Plastics Inc. Rock Hill, South Carolina	Dispoz-o Products Inc. Fountain Inn, South Carolina
			Tritex LLC Independence, Virginia	Honeywell International Chester, Virginia
			Adell Polymers Inc. Petersburg, West Virginia	

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NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
325212	Synthetic rubber mfg	>100	USA Synthetics Bentonville, Arkansas	<i>Garlock Rubber Technologies</i> <i>Paragould, Arkansas</i>
			Rotation Dynamics La Porte, Indiana	Jasper Rubber Products Jasper, Indiana
			Gilmur Group Independence, Missouri	
			Silicones, Inc. High Point, North Carolina	
			Insta-Mold Products Inc. Oaks, Pennsylvania	
			<i>Goodyear Tire and Rubber Co.</i> <i>Radford, Virginia</i>	
			Mullins International Dayton, Ohio	<i>Fypon Ltd.</i> <i>Archbold, Ohio</i>
325311	Nitrogenous fertilizer mfg	>50		Alaska Nitrogen Products, Inc. Kenai, Alaska
			Casa Grande Plant Food Co. Casa Grande, Arizona	<i>Apache Nitrogen Products, Inc.</i> <i>Benson, Arizona</i>
			Delta Farmers Association Grady, Arkansas	El Dorado Chemical Co. El Dorado, Arkansas
			Ceres Solutions LLP Westpoint, Indiana	
			Hydro Dynamics International Lansing, Michigan	
			Mid-west Agri-Chemico Inc. Cape Girardeau, Missouri	Omnium LLC Saint Joseph, Missouri
			Valley Crop Care Sidney, Montana	
			CPS Princeton, North Carolina	<i>McGill Environmental System</i> <i>Rose Hill, North Carolina</i>
			Milton Fertilizer Plant Milton, North Dakota	
			United Landmark, LLC Lancaster, Ohio	Andersons Columbus, Ohio
			Penn Canal Co. Belleville, Pennsylvania	<i>Excell Minerals</i> <i>Sarver, Pennsylvania</i>
			Carolina Eastern Pamlico Inc. Pamplico, South Carolina	
			Prescription Fertilizer & Chemical Ivor, Virginia	
			Fullen Fertilizer Co. Inc. Union, West Virginia	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
325312	Phosphatic fertilizer mfg	>100	Howard Johnson's Enterprises Neosho, Missouri	
			Growmark Cochranville, Pennsylvania	
325412	Pharmaceutical preparation	>1,000	Division-Medical Asst. Anchorage, Alaska	
			Medicis Pharamceutical Corp. Scottsdale, Arizona	
			NMHC Integral Little Rock, Arkansas	
			Pfizer Inc. Terre Haute, Indiana	<i>Bayer Corp</i> <i>Mishawaka, Indiana</i>
			J.B. Laboratories Holland, Michigan	Pfizer Inc. Kalamazoo, Michigan
			Teva Pharmaceuticals USA Inc. Mexico, Missouri	
			Novo Nordisk Pharmaceutical Clayton, North Carolina	
			Swanson Health Products Fargo, North Dakota	
			Barr Laboratories Inc. Cincinnati, Ohio	
			Bayer Corporation Myerstown, Pennsylvania	<i>GlaxoSmithKline</i> <i>Philadelphia, Pennsylvania</i>
			Palmetto State Pharmaceuticals Charleston, South Carolina	
			Pfizer Inc. Reston, Virginia	<i>Wyeth Pharmaceuticals</i> <i>Richmond, Virginia</i>
			Pfizer Inc. Fairmont, West Virginia	<i>Mylan Pharmaceuticals Inc.</i> <i>Morgantown, West Virginia</i>
326	Plastics and rubber products	None	Cadillac Plastic and Chemical Co. Anchorage, Alaska	
			Western Container Corporation Tolleson, Arizona	
			Crawford Industries Crawfordsville, Indiana	
			Alcoa Engineered Plastic Mattawan, Michigan	
			Big Sky Insulations Inc. Belgrade, Montana	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
327211	Flat glass mfg	>100	Custom Reflections Peoria, Arizona	Oldcastle Glass Phoenix, Arizona
			Hoosier Glass Co. Inc. Indianapolis, Indiana	Guardian Automotive Auburn, Indiana
			Wolverine Glass Products Grandville, Michigan	Guardian Industries Corporation Auburn Hills, Michigan
			Chippewa Glass and Mirror Co. Saint Louis, Missouri	Nordyne Inc. O'Fallon, Missouri
			Carolina Glass and Supply Hampstead, North Carolina	
				Cardinal Insulating Glass Fargo, North Dakota
			Global Home Products, LLC Lancaster, Ohio	Pilkington North America, Inc. Toledo, Ohio
			Norristown Glass Co. Norristown, Pennsylvania	PPG Industries Inc. Pittsburgh, Pennsylvania
			JPS Composite Materials Corp. Slater, South Carolina	
			<i>Old Castle Glass</i> <i>Warrenton, Virginia</i>	
			Paul Wissmach Glass Co. Paden City, West Virginia	
327310	Cement mfg	>50		Essroc Cement Speed, Indiana
				<i>Lafarge North America</i> <i>Bingham Farms, Michigan</i>
				Buzzi Unicem USA Inc. Cape Girardeau, Missouri
				Cemex Inc. Charlotte, North Carolina
				Cemex Inc. Fairborn, Ohio
				Lehigh Cement Co. Fleetwood, Pennsylvania
				Lafarge North America Harleyville, South Carolina
				Roanoke Cement Co. Troutville, Virginia

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
327993	Mineral wool mfg	>100	Plaschem Supply and Consulting Anchorage, Alaska	
			Desert Sun Fiberglass Systems Phoenix, Arizona	<i>Johns Manville Corporation Tucson, Arizona</i>
			Fiberglass Fabricators Inc. Ashdown, Arkansas	
			Fiberglass Fabricators Fort Wayne, Indiana	Reflectix Inc. Markleville, Indiana
			Hamilton Engineering Livonia, Michigan	<i>Sankuer Composite Technology Ira, Michigan</i>
			American Fibrex Joplin, Missouri	
			Fiberglass Structures Inc. Laurel, Montana	
			Albright Fiberglass Repair Durham, North Carolina	
			Fiberglass Specialties Minot, North Dakota	
			Great Lakes Textiles Cleveland, Ohio	USG Interiors, Inc. Cleveland, Ohio
			Colonial Fiberglass Industries Hanover, Pennsylvania	Certain Teed Corporation Mountain Top, Pennsylvania
			San Fiberglass Co. Murrells Inlet, South Carolina	New York Wire Co. Walterboro, South Carolina
			Fiberglass Manufacturing Co. Midland, Virginia	<i>Johns Manville Corporation Edinburg, Virginia</i>
Performance Fiberglass West Hamlin, West Virginia	<i>Guardian Fiberglass Inwood, West Virginia</i>			

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[32721x]	"Glass and glass products"	>250	United States Container Corporation Phoenix, Arizona	<i>Graham Packaging Co.</i> <i>Tolleson, Arizona</i>
			Old Castle Glass Indianapolis, Indiana	Pilkington Glass Co. Shelbyville, Indiana
			Wojan Window and Door Corporation Charlevoix, Michigan	
			Libbey Glass Inc. Saint Charles, Missouri	Gujarat Glass International Inc. Flat River, Missouri
			Valley Glass Inc. Kalispell, Montana	
			Sun Drop/Canada Dry Bottling Co. Rocky Mount, North Carolina	
			Machine Glass Specialists Springboro, Ohio	Anchor Hocking Glass Co. Lancaster, Ohio
				Drug Plastics & Glass Inc. Boyertown, Pennsylvania
			Eagle Glass Specialties Inc. Clarksburg, West Virginia	
331111	Iron & steel mills	>250	Schuff Steel Mesa, Arizona	Asarco Inc. - Mission Complex Sahuarita, Arizona
			Merit Steel Processing Inc. Fort Smith, Arkansas	Nucor Steel Blytheville, Arkansas
			Alro Steel Corporation Indianapolis, Indiana	Nucor Steel Crawfordsville, Indiana
			Michigan Wire Processing Inc. Lowell, Michigan	<i>Kenwal Pickling</i> <i>Dearborn, Michigan</i>
			Phoenix Manufacturing Cole Camp, Missouri	
			Skyline Stainless Billings, Montana	
			Nucor Corporation Charlotte, North Carolina	<i>DH Griffin Co.</i> <i>Greensboro, North Carolina</i>
			Mid-America Steel Corporation Cleveland, Ohio	Republic Engineered Products Lorain, Ohio
			Allan Industries Wilkes Barre, Pennsylvania	U.S. Steel Corporation Clairton, Pennsylvania
			Greer Metals Greer, South Carolina	Nucor Steel Huger, South Carolina
			Weston Co. Warrenton, Virginia	Roanoke Steel Roanoke, Virginia
			West Virginia Cold Drawn Point Pleasant, West Virginia	Mittal Steel USA Weirton, West Virginia

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NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
331511	Iron foundries	>250	Bentonville Casting Co. Bentonville, Arkansas	
			Hiler Industries La Porte, Indiana	<i>Grede New Castle Inc. New Castle, Indiana</i>
			East Jordan Iron Works Inc Sunfield, Michigan	East Jordan Iron Works Inc East Jordan, Michigan
			Clay & Bailey Manufacturing Co. Kansas City, Missouri	
			Foothills Water & Sewer Construction Stony Point, North Carolina	Charlotte Pipe and Foundry Co. Charlotte, North Carolina
			T&B Foundry Co. Cleveland, Ohio	
			Leed Foundry Inc. Saint Clair, Pennsylvania	<i>Donsco Inc. Wrightsville, Pennsylvania</i>
			Carolina Casting Co. Union, South Carolina	<i>Greenwood Foundry Co. Greenwood, South Carolina</i>
			HD Supply Co. Fredericksburg, Virginia	New River Castings Radford, Virginia
			Taylor's Iron and Metal Huntington, West Virginia	
331521	Aluminum die-casting foundries	>1,000	Southwestern Die-casting Co. Fort Smith, Arkansas	
			General Aluminum Mfg Co. Hunting- ton, Indiana	
			ICG Castings Inc. Bridgman, Michigan	
			Pace Industries Monroe City, Missouri	
			Matthews Foundry Inc. Matthews, North Carolina	
			Magnesium Aluminum Corp. Cleveland, Ohio	
			Bowersox Precision Castings Boothwyn, Pennsylvania	
			Dynacast, Inc. Spartanburg, South Carolina	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
331524	Aluminum foundries, except die-casting	>1,000	Alaskan Bronze Moose Pass, Alaska	
			Presto Casting Co. Glendale, Arizona	
			JW Aluminum Co. Russellville, Arkansas	
			Casting Technology Inc. Franklin, Indiana	
			Whitehall Products Ltd. Whitehall, Michigan	
			Thyssen Krupp Stahl Co. Warrensburg, Missouri	
			Aluminum Specialties Mandan, North Dakota	
			Thakar Aluminum Corp. Sandusky, Ohio	
			Harmony Castings Inc. Harmony, Pennsylvania	
			D&D Foundry Great Falls, South Carolina	
			Metal Casting Co. Bristol, Virginia	
[3312xx]	"Steel products from purchased steel"	None	Salt River Wire Products Inc. Phoenix, Arizona	
			Accel International Wolcotville, Indiana	
			Macsteel Monroe, Michigan	
			Lockweld Industries South West City, Missouri	
			Pine Ridge Post and Pole Arlee, Montana	
			Haynes Wire Co. Mountain Home, North Carolina	
			US Steel Corporation Lorain, Ohio	
			North American Fastener Corp. Bridgeport, West Virginia	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[33131x]	"Alumina and aluminum"	>250	Husky Manufacturing Co. Wasilla, Alaska	
			Kaiser Aluminum Corporation Chandler, Arizona	
			Reynolds Metal Co. Malvern, Arkansas	
			Alconex Specialty Products Fort Wayne, Indiana	
			Extruded Aluminum Corporation Belding, Michigan	Hutchinson FTS Inc. Troy, Michigan
			General Sign Co. Cape Girardeau, Missouri	
				Columbia Falls Aluminum Columbia Falls, Montana
			Aluminum Tool Fabricators Jonesville, North Carolina	<i>Indalex Aluminum Solutions Burlington, North Carolina</i>
			Crest Aluminum Products Mentor, Ohio	Gayston Corporation Springboro, Ohio
			Bristol Aluminum Levittown, Pennsylvania	Sapa Industrial Extrusions Cressona, Pennsylvania
			<i>Briteline Extrusions Inc. Summerville, South Carolina</i>	<i>Hydro North America Belton, South Carolina</i>
				Alcoa Inc. Richmond, Virginia
			Preferred Surfaces LLC Morganton, West Virginia	Alcan Rolled Products Ravenswood, West Virginia

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[3314xx]	"Nonferrous metals, except aluminum"	>250	Santoku America Inc. Tolleson, Arizona	Asarco Inc. - Ray Complex Hayden, Arizona
			Essex Group Inc. Kendallville, Indiana	<i>Alcoa Automotive</i> <i>Auburn, Indiana</i>
			Fritz Products Inc. River Rouge, Michigan	Huron Valley Steel Corporation Belleville, Michigan
			<i>Rapco Horizon Inc.</i> <i>Jackson, Missouri</i>	<i>Spartan Light Metal Products</i> <i>Mexico, Missouri</i>
			U.S. Antimony Corporation Thompson Falls, Montana	
			Victory White Metal Corporation Winston-Salem, North Carolina	
			Federal Metal Co. Cleveland, Ohio	
			Heyco Metals Inc. Reading, Pennsylvania	
			Metal Shapes and Alloys Piedmont, South Carolina	
			National Castings Corporation Virginia Beach, Virginia	<i>Nibco Virginia</i> <i>Stuarts Draft, Virginia</i>
			<i>St. Mary's Refining Co.</i> <i>Saint Marys, West Virginia</i>	
332	Fabricated metals	None	Northern Building Supplies Inc. Anchorage, Alaska	
			Syndicate Systems Middlebury, Indiana	
			Cleary Building Corporation California, Missouri	
			American Iron Billings, Montana	
			Jackson Steel Inc. Hendersonville, North Carolina	
			Fargo Tank & Steel Fargo, North Dakota	
			Mid-Ohio Mechanical Columbus, Ohio	
			Charleston Steel Co. Dunbar, West Virginia	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
333	Machinery	None	Pacific Dynamics Fairbanks, Alaska	
			New York Blower Company La Porte, Indiana	
			Lexmark International Inc. Kansas City, Missouri	
			Burlington Machine Service Burlington, North Carolina	
			Buckeye Gear Co. Cleveland, Ohio	
			Petitto Mine Equipment Inc. Morganton, West Virginia	

Table 9. Example facilities from Alaska with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311421	Fruit & vegetable canning	>1,000	North Pacific Processors Inc. Cordova, Alaska	
[3121xx]	"Beverages"	>500	Alaskan Brewing Co. Juneau, Alaska	
314	Textile product mills	>1,000	Nomar LLC Homer, Alaska	
315	Apparel	None	David Green Master Furrier Anchorage, Alaska	
316	Leather and allied products	None	Frontier Tanning Co. Anchorage, Alaska	
321113	Sawmills	None	Pacific Log and Lumber Ltd. Ketchikan, Alaska	
[32121x]	"Veneer, plywood, etc."	None	Fairbanks Truss Co. Fairbanks, Alaska	
[3219xx]	"Other wood products"	None	Alaskan Wood Moulding Anchorage, Alaska	
323	Printing and related activities	None	Alaska Litho Inc. Juneau, Alaska	
324110	Petroleum refineries	All		Flint Hills Resources North Pole, Alaska
325311	Nitrogenous fertilizer mfg	>50		Alaska Nitrogen Products, Inc. Kenai, Alaska

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
325412	Pharmaceutical preparation	>1,000	Division-Medical Asst. Anchorage, Alaska	
326	Plastics and rubber products	None	Cadillac Plastic and Chemical Co. Anchorage, Alaska	
327993	Mineral wool mfg	>100	Plaschem Supply and Consulting Anchorage, Alaska	
331524	Aluminum foundries, except die-casting	>1,000	Alaskan Bronze Moose Pass, Alaska	
[33131x]	"Alumina and aluminum"	>250	Husky Manufacturing Co. Wasilla, Alaska	
332	Fabricated metals	None	Northern Building Supplies Inc. Anchorage, Alaska	
333	Machinery	None	Pacific Dynamics Fairbanks, Alaska	

Table 10. Example facilities from Arizona with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[3121xx]	"Beverages"	>500	Coca-Cola Bottling Co. Flagstaff, Arizona	Coca-Cola Bottling Co. Tempe, Arizona
313	Textile mills	>500	BEI Sportswear Inc. Tempe, Arizona	
314	Textile product mills	>1,000	Arizona Tent and Events LLC Phoenix, Arizona	
321113	Sawmills	None	Reidhead Brothers Lumber Mill Nutrioso, Arizona	
[32121x]	"Veneer, plywood, etc."	None	R&K Lumber Gilbert, Arizona	
[3219xx]	"Other wood products"	None	Atrium Windows and Doors Tolleson, Arizona	
323	Printing and related activities	None	Bowne Financial Print Phoenix, Arizona	
324110	Petroleum refineries	All		Western Refining Inc. Tempe, Arizona
325211	Plastics material & resin mfg	>100	<i>Cytec Engineered Materials Tempe, Arizona</i>	<i>Guardian Fiberglass Kingman, Arizona</i>

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
325311	Nitrogenous fertilizer mfg	>50	Casa Grande Plant Food Co. Casa Grande, Arizona	<i>Apache Nitrogen Products, Inc.</i> <i>Benson, Arizona</i>
325412	Pharmaceutical preparation	>1,000	Medicis Pharamceutical Corporation Scottsdale, Arizona	
326	Plastics and rubber products	None	Western Container Corporation Tolleson, Arizona	
327211	Flat glass mfg	>100	Custom Reflections Peoria, Arizona	Oldcastle Glass Phoenix, Arizona
327993	Mineral wool mfg	>100	Desert Sun Fiberglass Systems Phoenix, Arizona	<i>Johns Manville Corporation</i> <i>Tucson, Arizona</i>
[32721x]	"Glass and glass products"	>250	United States Container Corporation Phoenix, Arizona	<i>Graham Packaging Co.</i> <i>Tolleson, Arizona</i>
331111	Iron & steel mills	>250	Schuff Steel Mesa, Arizona	Asarco Inc. - Mission Complex Sahuarita, Arizona
331524	Aluminum foundries, except die-casting	>1,000	Presto Casting Co. Glendale, Arizona	
[3312xx]	"Steel products from purchased steel"	None	Salt River Wire Products Inc. Phoenix, Arizona	
[33131x]	"Alumina and aluminum"	>250	T.A. Caid Industries Tucson, Arizona	
[3314xx]	"Nonferrous metals, except aluminum"	>250	Santoku America Inc. Tolleson, Arizona	Asarco Inc. - Ray Complex Hayden, Arizona

Table 11. Example facilities from Arkansas with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311221	Wet corn milling	>50	<i>Tate and Lyle</i> <i>Van Buren, Arkansas</i>	
311421	Fruit & vegetable canning	>1,000	Allen Canning Co. Van Buren, Arkansas	<i>Tyson Foods, Inc.</i> <i>Green Forest, Arkansas</i>
[3121xx]	"Beverages"	>500	Pepsi Bottling Group Fort Smith, Arkansas	

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NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
314	Textile product mills	>1,000	White Bag, Inc. North Little Rock, Arkansas	
315	Apparel	None	Fruit of the Loom, Inc. Jonesboro, Arkansas	
316	Leather and allied products	None	Wolverine Procurement, Inc. Jonesboro, Arkansas	
322110	Pulp mills	>100	Greenbay Packaging Inc. Heber Springs, Arkansas	Domtar Industries Ashdown, Arkansas
324110	Petroleum refineries	All		Lion Oil Co. El Dorado, Arkansas
325182	Carbon black mfg	>50	Columbian Chemicals Co. El Dorado, Arkansas	
325188	All other basic inorganic chemicals	>50	KTech Inc. Hot Springs, Arkansas	<i>Porocel Corporation</i> Little Rock, Arkansas
325211	Plastics material & resin mfg	>100	Mesa Industries, Inc. Fort Smith, Arkansas	<i>Crane Composites</i> Jonesboro, Arkansas
325212	Synthetic rubber mfg	>100	USA Synthetics Bentonville, Arkansas	<i>Garlock Rubber Technologies</i> Paragould, Arkansas
325311	Nitrogenous fertilizer mfg	>50	Delta Farmers Association Grady, Arkansas	El Dorado Chemical Co. El Dorado, Arkansas
325412	Pharmaceutical preparation	>1,000	NMHC Integral Little Rock, Arkansas	
327993	Mineral wool mfg	>100	Fiberglass Fabricators Inc. Ashdown, Arkansas	
331111	Iron & steel mills	>250	Merit Steel Processing Inc. Fort Smith, Arkansas	Nucor Steel Blytheville, Arkansas
331511	Iron foundries	>250	Bentonville Casting Co. Bentonville, Arkansas	
331521	Aluminum die-casting foundries	>1,000	Southwestern Die-casting Co. Fort Smith, Arkansas	
331524	Aluminum foundries, except die-casting	>1,000	JW Aluminum Co. Russellville, Arkansas	
[33131x]	"Alumina and aluminum"	>250	Alcoa Inc. Arkadelphia, Arkansas	

Table 12. Example facilities from Indiana with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311421	Fruit & vegetable canning	>1,000	Morgan Foods Inc. Austin, Indiana	
[3121xx]	"Beverages"	>500	Pepsi Americas Inc. Muncie, Indiana	
313	Textile mills	>500	Fiber Bond Corp. Trail Creek, Indiana	
314	Textile product mills	>1,000	Anchor Industries Evansville, Indiana	
315	Apparel	None	Berne Apparel Corporation New Haven, Indiana	
316	Leather and allied products	None	Kinro Manufacturing Elkhart, Indiana	
321113	Sawmills	None	Adkins Sawmill Mitchell, Indiana	
323	Printing and related activities	None	A-1 Graphics Muncie, Indiana	
325188	All other basic inorganic chemicals	>50	Ceres Solutions LLP Vincennes, Indiana	Curtis Dyna-fog Ltd. Westfield, Indiana
325211	Plastics material & resin mfg	>100	Brunk Corporation Goshen, Indiana	<i>DSM Engineering Plastics Evansville, Indiana</i>
325212	Synthetic rubber mfg	>100	Rotation Dynamics La Porte, Indiana	Jasper Rubber Products Jasper, Indiana
325311	Nitrogenous fertilizer mfg	>50	Ceres Solutions LLP Westpoint, Indiana	
325412	Pharmaceutical preparation	>1,000	Pfizer Inc. Terre Haute, Indiana	<i>Bayer Corp Mishawaka, Indiana</i>
326	Plastics and rubber products	None	Crawford Industries Crawfordsville, Indiana	
327211	Flat glass mfg	>100	Indy Glass Center Indianapolis, Indiana	Schott Gemtron Corporation Vincennes, Indiana
327310	Cement mfg	>50		Essroc Cement Speed, Indiana
327993	Mineral wool mfg	>100	Fiberglass Fabricators Fort Wayne, Indiana	Reflectix Inc. Markleville, Indiana

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[32721x]	"Glass and glass products"	>250	Old Castle Glass Indianapolis, Indiana	Pilkington Glass Co. Shelbyville, Indiana
331111	Iron & steel mills	>250	Alro Steel Corporation Indianapolis, Indiana	Nucor Steel Crawfordsville, Indiana
331511	Iron foundries	>250	Hiler Industries La Porte, Indiana	<i>Grede New Castle Inc.</i> <i>New Castle, Indiana</i>
331521	Aluminum die-casting foundries	>1,000	General Aluminum Mfg Co. Hunting- ton, Indiana	
331524	Aluminum foundries, except die-casting	>1,000	Casting Technology Inc. Franklin, Indiana	
[3312xx]	"Steel products from purchased steel"	None	Accel International Wolcotville, Indiana	
[33131x]	"Alumina and aluminum"	>250	Alconex Specialty Products Fort Wayne, Indiana	
[3314xx]	"Nonferrous metals, except aluminum"	>250	Essex Group Inc. Kendallville, Indiana	<i>Alcoa Automotive</i> <i>Auburn, Indiana</i>
332	Fabricated metals	None	Syndicate Systems Middlebury, Indiana	
333	Machinery	None	New York Blower Company La Porte, Indiana	

Table 13. Example facilities from Michigan with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311421	Fruit & vegetable canning	>1,000	Birdseye Foods Fennville, Michigan	
[31131x]	"Sugar"	>100	Michigan Sugar Co. Au Gres, Michigan	Michigan Sugar Co. Bay City, Michigan
[3121xx]	"Beverages"	>500	Coca-Cola Bottling Co. Kalamazoo, Michigan	Stroh Companies Inc. Detroit, Michigan
313	Textile mills	>500	Guildford Mills Inc. Madison Heights, Michigan	
314	Textile product mills	>1,000	Scott Group Inc. Grand Rapids, Michigan	

Size Thresholds for Greenhouse Gas Regulation: Who Would Be Affected by a 25,000-ton CO₂ Emissions Rule?

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
321113	Sawmills	none	Hardwoods of Michigan, Inc. Clinton, Michigan	
[32121x]	"Veneer, plywood, etc."	none	Davidson Plyforms Inc. Grand Rapids, Michigan	
[3219xx]	"Other wood products"	none	Handy Home Products Monroe, Michigan	
322110	Pulp mills	>100	Forest Resources Quinnesec, Michigan	New Page Corporation Escanaba, Michigan
323	Printing and related activities	none	Grandville Printing Co. Grandville, Michigan	
324110	Petroleum refineries	All		Marathon Petroleum Detroit, Michigan
325311	Nitrogenous fertilizer mfg	>50	Hydro Dynamics International Lansing, Michigan	
325412	Pharmaceutical preparation	>1,000	J.B. Laboratories Holland, Michigan	Pfizer Inc. Kalamazoo, Michigan
326	Plastics and rubber products	none	Alcoa Engineered Plastic Mattawan, Michigan	
327211	Flat glass mfg	>100	Wolverine Glass Products Grandville, Michigan	Guardian Industries Corporation Auburn Hills, Michigan
327310	Cement mfg	>50		<i>Lafarge North America Bingham Farms, Michigan</i>
327993	Mineral wool mfg	>100	Hamilton Engineering Livonia, Michigan	<i>Sankuer Composite Technology Ira, Michigan</i>
[32721x]	"Glass and glass products"	>250	Wojan Window and Door Corporation Charlevoix, Michigan	
331111	Iron & steel mills	>250	Michigan Wire Processing Inc. Lowell, Michigan	<i>Kenwal Pickling Dearborn, Michigan</i>
331511	Iron foundries	>250	East Jordan Iron Works Inc Sunfield, Michigan	East Jordan Iron Works Inc East Jordan, Michigan
331521	Aluminum die-casting foundries	>1,000	ICG Castings Inc. Bridgman, Michigan	
331524	Aluminum foundries, except die-casting	>1,000	Whitehall Products Ltd. Whitehall, Michigan	
[3312xx]	"Steel products from purchased steel"	none	Macsteel Monroe, Michigan	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[33131x]	"Alumina and aluminum"	>250	Extruded Aluminum Corporation Belding, Michigan	Hutchinson FTS Inc. Troy, Michigan
[3314xx]	"Nonferrous metals, except aluminum"	>250	Fritz Products Inc. River Rouge, Michigan	Huron Valley Steel Corporation Belleville, Michigan

Table 14. Example facilities from Missouri with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311421	Fruit & vegetable canning	>1,000	Jasper Products Joplin, Missouri	
[31131x]	"Sugar"	>100	Chase General Corporation Saint Joseph, Missouri	
[3121xx]	"Beverages"	>500	Arctic Ice Inc. St. Louis, Missouri	<i>Pepsi Americas Inc. St. Louis, Missouri</i>
313	Textile mills	>500	RM Coco Inc. Cape Girardeau, Missouri	
314	Textile product mills	>1,000	CDI Inc. Cape Girardeau, Missouri	
315	Apparel	None	Freshwater Apparel Bolivar, Missouri	
316	Leather and allied products	None	Sunrise Tannery Kansas City, Missouri	
321113	Sawmills	None	Adkins Sawmill Mitchell, Indiana	
[32121x]	"Veneer, plywood, etc."	None	Affordable Truss Exeter, Missouri	
[3219xx]	"Other wood products"	None	Cox and Son Lumber	
322110	Pulp mills	>100	Verso Paper Chesterfield, Missouri	AJM Packaging Corporation Joplin, Missouri
323	Printing and related activities	None	Four State Printing Co. Anderson, Missouri	
325188	All other basic inorganic chemicals	>50	Mead Technologies Inc. Rolla, Missouri	Mississippi Lime Co. Sainte Genevieve, Missouri

Size Thresholds for Greenhouse Gas Regulation: Who Would Be Affected by a 25,000-ton CO₂ Emissions Rule?

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
325211	Plastics material & resin mfg	>100	Vertex Plastics Kearney, Missouri	<i>Presence from Innovation LLC Hazelwood, Missouri</i>
325212	Synthetic rubber mfg	>100	Gilmur Group Independence, Missouri	
325311	Nitrogenous fertilizer mfg	>50	Mid-west Agri-Chemico Inc. Cape Girardeau, Missouri	Omnium LLC Saint Joseph, Missouri
325312	Phosphatic fertilizer mfg	>100	Howard Johnson's Enterprises Neosho, Missouri	
325412	Pharmaceutical preparation	>1,000	Teva Pharmaceuticals USA Inc. Mexico, Missouri	
326	Plastics and rubber products	None		
327211	Flat glass mfg	>100	Chippewa Glass and Mirror Co. Saint Louis, Missouri	Nordyne Inc. O'Fallon, Missouri
327310	Cement mfg	>50		Buzzi Unicem USA Inc. Cape Girardeau, Missouri
327993	Mineral wool mfg	>100	American Fibrex Joplin, Missouri	
[32721x]	"Glass and glass products"	>250	Libbey Glass Inc. Saint Charles, Missouri	Gujarat Glass International Inc. Flat River, Missouri
331111	Iron & steel mills	>250	Phoenix Manufacturing Cole Camp, Missouri	
331511	Iron foundries	>250	Clay & Bailey Manufacturing Co. Kansas City, Missouri	
331521	Aluminum die-casting foundries	>1,000	Pace Industries Monroe City, Missouri	
331524	Aluminum foundries, except die-casting	>1,000	Thyssen Krupp Stahl Co. Warrensburg, Missouri	
[3312xx]	«Steel products from purchased steel»	None	Lockweld Industries South West City, Missouri	
[33131x]	«Alumina and aluminum»	>250	General Sign Co. Cape Girardeau, Missouri	
[3314xx]	«Nonferrous metals, except aluminum»	>250	<i>Rapco Horizon Inc. Jackson, Missouri</i>	Spartan Light Metal Products Mexico, Missouri

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
332	Fabricated metals	None	Cleary Building Corporation California, Missouri	
333	Machinery	None	Lexmark International Inc. Kansas City, Missouri	

Table 15. Example facilities from Montana with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[31131x]	"Sugar"	>100	Western Sugar Co. Custer, Montana	Sidney Sugars Inc. Sidney, Montana
[3121xx]	"Beverages"	>500	Pepsi Bottling Group Butte, Montana	
313	Textile mills	>500	Gray Wolf Trading Co. Polson, Montana	
314	Textile product mills	>1,000	Sutton's Sportswear Co. Billings, Montana	
315	Apparel	None	Montana Knits, Inc. Helena, Montana	
316	Leather and allied products	None	Montana Leather Co. Billings, Montana	
321113	Sawmills	None	Four Corners Pine LLC Trout Creek, Montana	
[3219xx]	"Other wood products"	None	Alpine Log Homes Victor, Montana	
323	Printing and related activities	None	Advanced Litho Printing Great Falls, Montana	
324110	Petroleum refineries	All		Conoco Phillips Billings Refinery Billings, Montana
325188	All other basic inorganic chemicals	>50	<i>Montana Sulphur & Chemical Co.</i> <i>Billings, Montana</i>	American Chemet Corporation East Helena, Montana
325211	Plastics material & resin mfg	>100	Rocky Mountain Plastics Whitefish, Montana	
325311	Nitrogenous fertilizer mfg	>50	Valley Crop Care Sidney, Montana	
326	Plastics and rubber products	None	Big Sky Insulations Inc. Belgrade, Montana	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
327993	Mineral wool mfg	>100	Fiberglass Structures Inc. Laurel, Montana	
[32721x]	"Glass and glass products"	>250	Valley Glass Inc. Kalispell, Montana	
331111	Iron & steel mills	>250	Skyline Stainless Billings, Montana	
[3312xx]	"Steel products from purchased steel"	None	Pine Ridge Post and Pole Arlee, Montana	
[3314xx]	"Nonferrous metals, except aluminum"	>250	U.S. Antimony Corporation Thompson Falls, Montana	
332	Fabricated metals	None	American Iron Billings, Montana	

Table 16. Example facilities from North Carolina with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311221	Wet corn milling	>50	Abbitt's Mill Inc. Williamston, North Carolina	Corn Products Winston-Salem, North Carolina
311421	Fruit & vegetable canning	>1,000	TW Garner Food Co. Winston-Salem, North Carolin	
[31131x]	"Sugar"	>100	Amstar Corporation Charlotte, North Carolina	
[3121xx]	"Beverages"	>500	Coca-Cola Bottling Co. Raleigh, North Carolina	Coca-Cola Bottling Co. Charlotte, North Carolina
[3122xx]	"Tobacco"	>250	<i>RJ Reynolds Tobacco Co. Winston-Salem, North Carolina</i>	
313	Textile mills	>500	Glen Raven Inc. Burlington, North Carolina	
314	Textile product mills	>1,000	RL Stowe Mills Belmont, North Carolina	
315	Apparel	None	Interstate Narrow Fabrics Inc. Haw River, North Carolina	
316	Leather and allied products	None	D&W Leather Products Co. Gastonia, North Carolina	
321113	Sawmills	None	Sunrise Sawmill Asheville, North Carolina	

Size Thresholds for Greenhouse Gas Regulation: Who Would Be Affected by a 25,000-ton CO₂ Emissions Rule?

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[32121x]	"Veneer, plywood, etc."	None	Georgia-Pacific Plywood Plant Dudley, North Carolina	
[3219xx]	«Other wood products»	None	Pinnacle Builders Inc. Waynesville, North Carolina	
322110	Pulp mills	>100	Brawley Timber Co. Murphy, North Carolina	Blue Ridge Paper Products Canton, North Carolina
323	Printing and related activities	None	Carolina Printing Raleigh, North Carolina	
325188	All other basic inorganic chemicals	>50	Elon Specialties Concord, North Carolina	<i>Arclin Moncure, North Carolina</i>
325211	Plastics material & resin mfg	>100	Polyreps Inc. Monroe, North Carolina	Clariant Corporation Charlotte, North Carolina
325212	Synthetic rubber mfg	>100	Silicones, Inc. High Point, North Carolina	
325311	Nitrogenous fertilizer mfg	>50	CPS Princeton, North Carolina	<i>McGill Environmental System Rose Hill, North Carolina</i>
325412	Pharmaceutical preparation	>1,000	Novo Nordisk Pharmaceutical Clayton, North Carolina	
327211	Flat glass mfg	>100	Carolina Glass and Supply Hampstead, North Carolina	
327310	Cement mfg	>50		Cemex Inc. Charlotte, North Carolina
327993	Mineral wool mfg	>100	Albright Fiberglass Repair Durham, North Carolina	
[32721x]	"Glass and glass products"	>250	Sun Drop/Canada Dry Bottling Co. Rocky Mount, North Carolina	
331111	Iron & steel mills	>250	Nucor Corporation Charlotte, North Carolina	<i>DH Griffin Co. Greensboro, North Carolina</i>
331511	Iron foundries	>250	Foothills Water & Sewer Construction Stony Point, North Carolina	Charlotte Pipe and Foundry Co. Charlotte, North Carolina
331521	Aluminum die-casting foundries	>1,000	Matthews Foundry Inc. Matthews, North Carolina	
[3312xx]	"Steel products from purchased steel"	None	Haynes Wire Co. Mountain Home, North Carolina	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[33131x]	"Alumina and aluminum"	>250	Aluminum Tool Fabricators Jonesville, North Carolina	<i>Indalex Aluminum Solutions Burlington, North Carolina</i>
[3314xx]	"Nonferrous metals, except aluminum"	>250	Victory White Metal Corporation Winston-Salem, North Carolina	
332	Fabricated metals	None	Jackson Steel Inc. Hendersonville, North Carolina	
333	Machinery	None	Burlington Machine Service Burlington, North Carolina	

Table 17. Example facilities from North Dakota with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
[31131x]	"Sugar"	>100	American Crystal Sugar Cavalier, North Dakota	American Crystal Sugar Drayton, North Dakota
[3121xx]	"Beverages"	>500	Pepsi Bottling Group Dickinson, North Dakota	
316	Leather and allied products	None	Dacotah Leather Co. Grand Forks, North Dakota	
321113	Sawmills	None	Frieds Saw Mill Inc. Mandan, North Dakota	
323	Printing and related activities	None	Cole Papers Fargo, North Dakota	
324110	Petroleum refineries	All		Tesoro Refinery Mandan, North Dakota
325211	Plastics material & resin mfg	>100	Terhorst Manufacturing Co. Minot, North Dakota	
325311	Nitrogenous fertilizer mfg	>50	Milton Fertilizer Plant Milton, North Dakota	
325412	Pharmaceutical preparation	>1,000	Swanson Health Products Fargo, North Dakota	
327211	Flat glass mfg	>100		Cardinal Insulating Glass Fargo, North Dakota
327993	Mineral wool mfg	>100	Fiberglass Specialties Minot, North Dakota	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
331524	Aluminum foundries, except die-casting	>1,000	Aluminum Specialties Mandan, North Dakota	
332	Fabricated metals	None	Fargo Tank & Steel Fargo, North Dakota	

Table 18. Example facilities from Ohio with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311221	Wet corn milling	>50		Cargill Corn Milling Inc. Dayton, Ohio
311421	Fruit & vegetable canning	>1,000	Herman Pickle Co. Garrettsville, Ohio	
[31131x]	"Sugar"	>100	A&A Distributors Inc. Cleveland, Ohio	<i>American Sugar Refining Cleveland, Ohio</i>
[3121xx]	"Beverages"	>500	Coca-Cola Bottling Co. Twinsburg, Ohio	<i>Anheuser-Busch Co. Columbus, Ohio</i>
313	Textile mills	>500	Drapery Stitch Delphos, Ohio	
314	Textile product mills	>1,000	American Pacific Enterprises Grove City, Ohio	
315	Apparel	None	Omnova Solutions, Inc. Akron, Ohio	
321113	Sawmills	None	J. McCoy Lumber Co. Ltd. Peebles, Ohio	
[32121x]	"Veneer, plywood, etc."	None	Stark Truss Co. Inc. Washington Court House, Ohio	
[3219xx]	"Other wood products"	None	Ohio Valley Lumber Piketon, Ohio	
322110	Pulp mills	>100	B&B Paper Converters Inc. Cleveland, Ohio	Mead Westvaco Corporation Chillicothe, Ohio
323	Printing and related activities	None	Hopkins Printing Inc. Columbus, Ohio	
324110	Petroleum refineries	All		Marathon Petroleum Canton, Ohio
325188	All other basic inorganic chemicals	>50	Ohio Carbon Blank Willoughby, Ohio	Perstorp Polyols Inc. Toledo, Ohio

Size Thresholds for Greenhouse Gas Regulation: Who Would Be Affected by a 25,000-ton CO₂ Emissions Rule?

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
325211	Plastics material & resin mfg	>100	Buckeye Polymers Inc. Lodi, Ohio	Lubrizol Advanced Materials Cleveland, Ohio
325212	Synthetic rubber mfg	>100	Mullins International Dayton, Ohio	<i>Fypon Ltd.</i> <i>Archbold, Ohio</i>
325311	Nitrogenous fertilizer mfg	>50	United Landmark, LLC Lancaster, Ohio	Andersons Columbus, Ohio
325412	Pharmaceutical preparation	>1,000	Barr Laboratories Inc. Cincinnati, Ohio	
327211	Flat glass mfg	>100	Global Home Products, LLC Lancaster, Ohio	Pilkington North America, Inc. Toledo, Ohio
327310	Cement mfg	>50		Cemex Inc. Fairborn, Ohio
327993	Mineral wool mfg	>100	Great Lakes Textiles Cleveland, Ohio	USG Interiors, Inc. Cleveland, Ohio
[32721x]	«Glass and glass products»	>250	Machine Glass Specialists Springboro, Ohio	Anchor Hocking Glass Co. Lancaster, Ohio
331111	Iron & steel mills	>250	Mid-America Steel Corporation Cleveland, Ohio	Republic Engineered Products Lorain, Ohio
331511	Iron foundries	>250	T&B Foundry Co. Cleveland, Ohio	
331521	Aluminum die-casting foundries	>1,000	Magnesium Aluminum Corp. Cleveland, Ohio	
331524	Aluminum foundries, except die-casting	>1,000	Thakar Aluminum Corp. Sandusky, Ohio	
[3312xx]	“Steel products from purchased steel”	None	US Steel Corporation Lorain, Ohio	
[33131x]	“Alumina and aluminum”	>250	Crest Aluminum Products Mentor, Ohio	Gayston Corporation Springboro, Ohio
[3314xx]	“Nonferrous metals, except aluminum”	>250	Federal Metal Co. Cleveland, Ohio	
332	Fabricated metals	None	Mid-Ohio Mechanical Columbus, Ohio	
333	Machinery	None	Buckeye Gear Co. Cleveland, Ohio	

Table 19. Example facilities from Pennsylvania with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311221	Wet corn milling	>50	Tate and Lyle Morrisville, Pennsylvania	
311421	Fruit & vegetable canning	>1,000	Knouse Foods Biglerville, Pennsylvania	<i>Heinz North America Pittsburgh, Pennsylvania</i>
[3121xx]	"Beverages"	>500	Coca-Cola Bottling Co. Pottsville, Pennsylvania	<i>Coca-Cola Bottling Co. Philadelphia, Pennsylvania</i>
313	Textile mills	>500	American Silk Mills Hudson, Pennsylvania	
314	Textile product mills	>1,000	Fabtex Inc. Danville, Pennsylvania	
321113	Sawmills	None	Bradford Forest Products Bradford, Pennsylvania	
322110	Pulp mills	>100	Metzler Forest Products Woodland, Pennsylvania	Domtar Industries Johnsonburg, Pennsylvania
324110	Petroleum refineries	All		Sunoco Inc. Philadelphia, Pennsylvania
325188	All other basic inorganic chemicals	>50	Fedchem Inc. Bethlehem, Pennsylvania	BASF Corporation Erie, Pennsylvania
325211	Plastics material & resin mfg	>100	Fiber Depot Inc. Harrisville, Pennsylvania	Nova Chemicals Inc. Coraopolis, Pennsylvania
325212	Synthetic rubber mfg	>100	Insta-Mold Products Inc. Oaks, Pennsylvania	
325311	Nitrogenous fertilizer mfg	>50	Penn Canal Co. Belleville, Pennsylvania	<i>Excell Minerals Sarver, Pennsylvania</i>
325312	Phosphatic fertilizer mfg	>100	Growmark Cochranville, Pennsylvania	
325412	Pharmaceutical preparation	>1,000	Bayer Corporation Myerstown, Pennsylvania	<i>GlaxoSmithKline Philadelphia, Pennsylvania</i>
327211	Flat glass mfg	>100	Norristown Glass Co. Norristown, Pennsylvania	PPG Industries Inc. Pittsburgh, Pennsylvania
327310	Cement mfg	>50		Lehigh Cement Co. Fleetwood, Pennsylvania
327993	Mineral wool mfg	>100	Colonial Fiberglass Industries Hanover, Pennsylvania	Certain Teed Corporation Mountain Top, Pennsylvania
[32721x]	"Glass and glass products"	>250		Drug Plastics & Glass Inc. Boyertown, Pennsylvania

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
331111	Iron & steel mills	>250	Allan Industries Wilkes Barre, Pennsylvania	U.S. Steel Corporation Clairton, Pennsylvania
331511	Iron foundries	>250	Leed Foundry Inc. Saint Clair, Pennsylvania	<i>Donsco Inc.</i> <i>Wrightsville, Pennsylvania</i>
331521	Aluminum die-casting foundries	>1,000	Bowersox Precision Castings Boothwyn, Pennsylvania	
331524	Aluminum foundries, except die-casting	>1,000	Harmony Castings Inc. Harmony, Pennsylvania	
[33131x]	"Alumina and aluminum"	>250	Bristol Aluminum Levittown, Pennsylvania	Sapa Industrial Extrusions Cressona, Pennsylvania
[3314xx]	"Nonferrous metals, except aluminum"	>250	Heyco Metals Inc. Reading, Pennsylvania	

Table 20. Example facilities from South Carolina with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311421	Fruit & vegetable canning	>1,000	Wood Brothers Inc. West Columbia, South Carolina	
[3121xx]	"Beverages"	>500	Coca-Cola Bottling Co. Rock Hill, South Carolina	
313	Textile mills	>500	Milliken and Company Spartanburg, South Carolina	Swift Galey Society Hill, South Carolina
314	Textile product mills	>1,000	Lugoff Industrial Textile Lugoff, South Carolina	
315	Apparel	None	Arrowhead Textile Co. Spartanburg, South Carolina	
316	Leather and allied products	None	John King Leather Co. Columbia, South Carolina	
321113	Sawmills	None	Dempsey Wood Products Inc. Rowesville, South Carolina	
322110	Pulp mills	>100	Tyson Pulpwood Georgetown, South Carolina	<i>Abitibi Bowater Inc.</i> <i>Greenville, South Carolina</i>
323	Printing and related activities	None	Printers Ink Summerville, South Carolina	

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
325188	All other basic inorganic chemicals	>50	Pioneer Chemicals Inc. Greenville, South Carolina	Carbide Alloys Inc. Columbia, South Carolina
325211	Plastics material & resin mfg	>100	Diamond Plastics Inc. Rock Hill, South Carolina	Dispoz-o Products Inc. Fountain Inn, South Carolina
325311	Nitrogenous fertilizer mfg	>50	Carolina Eastern Pamlico Inc. Pamplico, South Carolina	
325412	Pharmaceutical preparation	>1,000	Palmetto State Pharmaceuticals Charleston, South Carolina	
327211	Flat glass mfg	>100	JPS Composite Materials Corp. Slater, South Carolina	
327310	Cement mfg	>50		Lafarge North America Harleyville, South Carolina
327993	Mineral wool mfg	>100	San Fiberglass Co. Murrells Inlet, South Carolina	New York Wire Co. Walterboro, South Carolina
331111	Iron & steel mills	>250	Greer Metals Greer, South Carolina	Nucor Steel Huger, South Carolina
331511	Iron foundries	>250	Carolina Casting Co. Union, South Carolina	<i>Greenwood Foundry Co.</i> <i>Greenwood, South Carolina</i>
331521	Aluminum die-casting foundries	>1,000	Dynacast, Inc. Spartanburg, South Carolina	
331524	Aluminum foundries, except die-casting	>1,000	D&D Foundry Great Falls, South Carolina	
[33131x]	"Alumina and aluminum"	>250	<i>Briteline Extrusions Inc.</i> <i>Summerville, South Carolina</i>	<i>Hydro North America</i> <i>Belton, South Carolina</i>
[3314xx]	"Nonferrous metals, except aluminum"	>250	Metal Shapes and Alloys Piedmont, South Carolina	

Table 21. Example facilities from Virginia with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311421	Fruit & vegetable canning	>1,000	H.B. Hunter Co. Norfolk, Virginia	
[3121xx]	"Beverages"	>500	Dr. Pepper Bottling Co. Pulaski, Virginia	

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NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
313	Textile mills	>500	Jefferson Mills Pulaski, Virginia	<i>National Textile Galax, Virginia</i>
314	Textile product mills	>1,000	Dixie Fibertex Co. Richmond, Virginia	
322110	Pulp mills	>100	Gladys Timber Products Gladys, Virginia	
323	Printing and related activities	None		
324110	Petroleum refineries	All		ExxonMobil Refining & Supply Fairfax, Virginia
325182	Carbon black mfg	>50	Azdel Inc. Forest, Virginia	
325188	All other basic inorganic chemicals	>50	Nalco Chemical Co. Hopewell, Virginia	
325211	Plastics material & resin mfg	>100	Tritex LLC Independence, Virginia	Honeywell International Chester, Virginia
325212	Synthetic rubber mfg	>100	<i>Goodyear Tire and Rubber Co. Radford, Virginia</i>	
325311	Nitrogenous fertilizer mfg	>50	Prescription Fertilizer & Chemical Ivor, Virginia	
325412	Pharmaceutical preparation	>1,000	Pfizer Inc. Reston, Virginia	<i>Wyeth Pharmaceuticals Richmond, Virginia</i>
327211	Flat glass mfg	>100	<i>Old Castle Glass Warrenton, Virginia</i>	
327310	Cement mfg	>50		Roanoke Cement Co. Troutville, Virginia
327993	Mineral wool mfg	>100	Fiberglass Manufacturing Co. Midland, Virginia	<i>Johns Manville Corporation Edinburg, Virginia</i>
331111	Iron & steel mills	>250	Weston Co. Warrenton, Virginia	Roanoke Steel Roanoke, Virginia
331511	Iron foundries	>250	HD Supply Co. Fredericksburg, Virginia	New River Castings Radford, Virginia
[33131x]	"Alumina and aluminum"	>250		Alcoa Inc. Richmond, Virginia
[3314xx]	"Nonferrous metals, except aluminum"	>250	National Castings Corporation Virginia Beach, Virginia	<i>Nibco Virginia Stuarts Draft, Virginia</i>

Table 22. Example facilities from West Virginia with expected annual CO₂ emissions above and below 25,000 tons. Facilities in *italics* are potentially close to the threshold for regulation.

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
311421	Fruit & vegetable canning	>1,000	Knouse Foods Cooperative, Inc. Inwood, West Virginia	
[31131x]	"Sugar"	>100	Holl's Chocolate Inc. Vienna, West Virginia	
[3121xx]	"Beverages"	>500	Pepsi Bottling Group Nitro, West Virginia	
[3122xx]	"Tobacco"	>250	U.S. Smokeless Tobacco Weirton, West Virginia	
313	Textile mills	>500	Edgewood Country Club Charleston, West Virginia	
314	Textile product mills	>1,000	Palmer Smith Co. Farmington, West Virginia	
315	Apparel	None	New Morton Shirt Co. Masontown, West Virginia	
316	Leather and allied products	None	Green Valley Manufacturing Cameron, West Virginia	
321113	Sawmills	None	Bowling Timber and Logging Liberty, West Virginia	
[32121x]	"Veneer, plywood, etc."	None	Amron Building Components Bickmore, West Virginia	
[3219xx]	"Other wood products"	None	Freedom Homes Nitro, West Virginia	
322110	Pulp mills	>100	US Tag and Ticket Huntington, West Virginia	
323	Printing and related activities	None	WV Printing Charleston, West Virginia	
325182	Carbon black mfg	>50	Cabot Corporation Waverly, West Virginia	<i>Columbian Chemicals Co. Proctor, West Virginia</i>
325188	All other basic inorganic chemicals	>50	Occidental Chemical Corporation Belle, West Virginia	Chemtura Corporation Morgantown, West Virginia
325211	Plastics material & resin mfg	>100	Adell Polymers Inc. Petersburg, West Virginia	
325311	Nitrogenous fertilizer mfg	>50	Fullen Fertilizer Co. Inc. Union, West Virginia	

Size Thresholds for Greenhouse Gas Regulation: Who Would Be Affected by a 25,000-ton CO₂ Emissions Rule?

NAICS Code	Industry	Best estimate size threshold for regulation (employees)	Facilities estimated to be BELOW 25,000 tons CO ₂ annually	Facilities estimated to be ABOVE 25,000 tons CO ₂ annually
325412	Pharmaceutical preparation	>1,000	Pfizer Inc. Fairmont, West Virginia	<i>Mylan Pharmaceuticals Inc.</i> <i>Morgantown, West Virginia</i>
327211	Flat glass mfg	>100	Paul Wissmach Glass Co. Paden City, West Virginia	
327993	Mineral wool mfg	>100	Performance Fiberglass West Hamlin, West Virginia	<i>Guardian Fiberglass</i> <i>Inwood, West Virginia</i>
[32721x]	"Glass and glass products"	>250	Eagle Glass Specialties Inc. Clarksburg, West Virginia	
331111	Iron & steel mills	>250	West Virginia Cold Drawn Point Pleasant, West Virginia	Mittal Steel USA Weirton, West Virginia
331511	Iron foundries	>250	Taylor's Iron and Metal Huntington, West Virginia	
[3312xx]	"Steel products from purchased steel"	None	North American Fastener Corp. Bridgeport, West Virginia	
[33131x]	"Alumina and aluminum"	>250	Preferred Surfaces LLC Morgantown, West Virginia	Alcan Rolled Products Ravenswood, West Virginia
[3314xx]	"Nonferrous metals, except aluminum"	>250	<i>St. Mary's Refining Co.</i> <i>Saint Marys, West Virginia</i>	
332	Fabricated metals	None	Charleston Steel Co. Dunbar, West Virginia	
333	Machinery	None	Petitto Mine Equipment Inc. Morgantown, West Virginia	

4. Methodology

This report estimates the CO₂ emissions for various industries based on their direct use of fossil fuels. CO₂ emissions from purchased electricity are excluded because electricity generators report those emissions. Process emissions of CO₂, methane, nitrous oxide, HFCs, PFCs, and SF₆ are not counted here.

4.01. A note on non-CO₂ gases and process emissions

Because the available data only allows us to present CO₂ emissions from the use of fossil fuels in manufacturing, process emissions and emissions of other non-CO₂ GHGs, such as methane and SF₆, are not included in this analysis. Process emissions are defined as those CO₂ emissions that are derived from industrial processes, rather than from energy use. An example of non-energy process emissions (thus excluded from this analysis) is the venting of CO₂ in lime manufacture that occurs when calcium carbonate is heated and converted to lime and CO₂ (lime is also a component of cement). It should be noted that the U.S. Environmental Protection Agency treats all nonfuel manufacturing emissions as emissions from industrial “processes.” For example, the EPA considers emissions from both the production and the use of metallurgical coke in the steel industry to be “non-energy (industrial) processes, not energy (combustion) processes” and lists it as “industrial process” emissions.⁹

In 2002, industrial emissions of CO₂ not caused by either fuel- or nonfuel use of energy accounted for 69.4 million tons (Mt) of total U.S. carbon dioxide emissions.¹⁰ This is about 8.1% of fossil fuel-related CO₂ emissions in manufacturing in 2002, which was calculated for this report to be 852 Mt, excluding the contribution of electricity consumption.¹¹ Cement manufacture was by far the largest contributor of process emissions, at 43.0 Mt. Other significant sources are lime manufacture (14.1 Mt), soda ash manufacture (3.5 Mt) and aluminum production (4.0 Mt). The exclusion of process emissions does not affect the conclusions of this report. Due to high process emissions, in addition to fuel-related emissions, all cement and lime manufacturing facilities would be expected to exceed the 25,000-ton threshold. Due to lack of data, comprehensive emission estimates for aluminum production were not included in this report, except under the wider category of “Alumina and aluminum,” which includes aluminum oxide manufacture and secondary metals industries. Nonetheless, it is safe to assume that all primary aluminum production facilities would emit CO₂ in excess of 25,000 tons per year.

Other process emissions of greenhouse gases include methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). In total, industrial process emissions of CO₂ and other greenhouse gases in 2002 amounted to the equivalent of 227.7 MtCO₂, which is 27% of the total CO₂ manufacturing emissions derived from the use of fossil fuels. Table 23 provides an overview of the amount and sources of these greenhouse gases in manufacturing in 2002.

Table 23. Industrial process emissions of greenhouse gases in 2002.¹²

Greenhouse Gas	Industry Source	MtCO ₂ equivalent
CO ₂	Cement manufacture	43.0
	Limestone use (incl. lime manufacture)	17.1
	Soda ash manufacture and use	3.9
	Carbon dioxide manufacture	1.4
	Aluminum manufacture	4.0

⁹ U.S. EPA, 2006, 4-4.

¹⁰ U.S. EIA, 2006(a), Table 14, 28.

¹¹ U.S. EIA, 2006(b), Table 2. The contribution of net electricity consumption to total CO₂ emissions from manufacturing in 2002 was reported as 540.7 Mt, and total manufacturing CO₂ emissions were reported as 1,401.2 Mt, for a difference of 860.5 Mt. The calculated equivalent value in this report is 851.7 MtCO₂.

¹² CO₂ emissions: U.S. EIA, 2006(a), Table 14, 28; all other gases: U.S. EPA, 2006, Table 2-8, 2-14.

Greenhouse Gas	Industry Source	MtCO ₂ equivalent
CH ₄	Petrochemical production	1.5
	Iron and steel production	1.0
N ₂ O	Nitric acid production	17.2
	Adipic acid production	5.9
HFCs, PFCs, and SF ₆	Substitution of ozone-depleting substances	86.2
	HCFC-22 production	19.8
	Electrical transmission and distribution	14.5
	Semiconductor manufacture	4.4
	Aluminum production	5.3
	Magnesium production and processing	2.6
Total		227.7

4.02. Data sources and calculation methods

Answering the question posed in the introduction—who would be regulated under a national cap-and-trade program with a 25,000-ton threshold?—requires information on the pattern of energy use across each manufacturing industry. Specifically, the amount and type of fuel used by each industry must be known but also how that energy use changes relative to the size of manufacturing facilities.

That information is found in the Energy Information Administration's (EIA) Manufacturing Energy Consumption Survey (MECS), which organizes fuel consumption data by industry according to the North American Industry Classification System (NAICS).¹³ Most importantly, MECS data provide annual fuel consumption per employee in each of six size categories: fewer than 50, 50–99, 100–249, 250–499, 500–999, and more than 1,000 employees. While fuel use per employee changes across the six size categories, the composition of the fuel mix is assumed to be constant, as EIA reports only one energy profile for each industry. It is possible, and even quite likely, that a small facility in a given industry may use a slightly different energy mix from a typical large facility in the same industry. However, the energy profile of an industry is determined primarily by the nature of the industry, which differentiates it from other industries.

The next step is to calculate CO₂ emissions per unit of fuel consumed in each industry. Once the composition of the fuel mix is known, its quantity (annual fuel use per employee) is multiplied by an emission coefficient (CO₂ emissions per unit fuel) to derive total annual CO₂ emissions per employee. The emission coefficients used are estimated or documented by EIA in its reports on national emissions of greenhouse gases.¹⁴ Different coefficients, one for each type of fuel, were weighted by relative composition of the fuel mix to generate a single coefficient for each industry. The product of that composite emission coefficient and the annual energy use per employee in each facility size category provided the annual CO₂ emissions per employee for each size category.

Annual CO₂ emissions per employee in each size category needs to inform an estimate of how much CO₂ might be emitted by a typical facility of that size category. Since there is no publicly available information on the energy use and size of individual manufacturing facilities in the country, it is necessary to apply averages. The U.S. Census Bureau publishes information on the total number of facilities and total number of employees within each of ten size categories within each industry (by the same NAICS classification codes used by EIA).¹⁵ The Census Bureau's ten size categories match well enough to be used with EIA's six size categories.¹⁶ The census data provide the basis for calculating the average number of employees within each facility size

¹³ U.S. EIA, 2002 Manufacturing Energy Consumption Survey (MECS), 2002 Data Tables.

¹⁴ U.S. EIA, 2006(c).

¹⁵ U.S. Census Bureau, 2005.

¹⁶ The range of 1–49 employees is represented by four segments (1–4, 5–9, 10–19, and 20–49 employees) and the range above 1,000 is represented by two segments (1,000–2,499, and 2,500 employees or more).

category of each industry. This serves to establish the average annual CO₂ emissions for each size category by simple multiplication.

The size category in each industry in which the average annual emissions per facility exceed the 25,000-ton threshold determined the estimated size of a facility that would be required to report its emissions. For example, if the average annual emissions of facilities with 250–499 employees were 26,000 tons, then all facilities larger than 250 employees would be assumed to report their emissions. Since the total number of employees and facilities in each size category is known, the estimate of total CO₂ emissions reported are also known.

One drawback of this methodology is its reliance on averages across a relatively large size range. In the example above, the average emissions across the range of facilities with 250–499 employees may be low enough that it is doubtful that all facilities within the range would exceed the threshold, even though they do “on average.” However, this methodology is made necessary by the need to quantify an estimate of the total number of facilities affected and their share of total emissions in the industry, because data are available only by size category and not by individual facilities.

To partially address this shortcoming, this report provides an estimate, to the extent feasible, of the approximate facility size at which 25,000 tons of CO₂ emissions would be expected for each industry. This was done by dividing the threshold value of 25,000 tons by the average annual emission per employee in each size category. Since average emissions per employee vary between size categories, and often quite significantly, it is sometimes difficult to identify a specific threshold size, and a size range must suffice.

4.03. Comments on data consistency and availability

In some instances both census data and energy data were withheld for one or more size categories of an industry. For the number of employees, the census data sometimes provided a size range instead of a specific value, presumably to preserve confidentiality. Energy use was similarly withheld, both at the facility level (energy use per employee) and at the industry level (the contribution of one or more fuel types to the industry’s fuel mix). Compensation was made when possible by reasonable estimation from total reported energy use and total reported number of employees, relative to reported figures for those size categories where data were not withheld. When information on the energy mix of an industry was too fragmented, separately reported CO₂ emission values by industry were used to formulate an alternate emission coefficient for that industry. While this alternate data source was not available for all manufacturing categories, it did help with many of the most energy-intensive industries such as chemical and metals manufacturing.

Apparent inconsistencies were noted between census data, EIA’s reported energy use per employee, and reported total energy use. EIA notes in its 2002 MECS data tables that energy use per employee is based in part on the 2002 Economic Census (Industry Series). However, the product of energy use per employee from MECS tables and total energy use per size category from the census data generally did not match precisely EIA’s reported total energy use. The discrepancy was generally not large but significant enough that it seemed appropriate to proportionately re-scale energy use statistics per employee in each industry and size category so that the product of the rate of energy use (EIA) and the number of employees (Census data) would match EIA’s total reported energy use.

5. CO₂ Emission Characteristics of Manufacturing

This section provides greater detail and context on the results for each manufacturing industry.

First, it establishes for each industry the smallest size category (by number of employees) regulated under a 25,000-ton threshold. Defined by EIA and Census Bureau reporting systems, the six categories are: 1–49, 50–99, 100–249, 250–499, 500–999, and more than 1,000 employees. The number and percentage of firms regulated is noted, as well as the amount and percentage of industry CO₂ emissions covered.

Second, the actual average threshold size of a facility in any given industry is identified to the extent that is feasible. Even though data are not available for facilities individually, and only in the context of broad size categories, it is often possible to derive a better estimate of the size of a facility, by number of employees, when a given threshold of emissions may be exceeded. For example, the average emissions of facilities of 500–999 employees in a given industry may exceed a 25,000-ton threshold but average emissions per employee may indicate that only facilities of more than 600 employees are actually likely to do so. This is not always a simple exercise because the average emission rate can vary significantly between size categories within a single industry.

5.01. Food (NAICS code 311)

The food manufacturing industry includes 48 sub-categories under the NAICS classification system. EIA reported energy use per employee in 2002 for three of these under the combined category “Sugar” and for two more individually, wet corn milling and fruit and vegetable canning. Sugar production and wet corn milling are very energy intensive segments of the food industry while fruit and vegetable canning is more representative of average energy use and CO₂ emissions across all segments of the food industry.

As is true for most primary industry categories, the observed average energy use and CO₂ emissions for the industry as a whole may not be representative of individual sub-categories. For example, the average CO₂ emissions per employee in the combined sugar category is about 10 times greater than the food industry average, and CO₂ emissions per employee in wet corn milling are more than four times greater on average than in sugar manufacturing. While average characteristics of the food industry are discussed below, it is important to keep in mind that any food category that is likely to be more or less energy intensive than the mean, would not be represented well by industry averages.

Most food manufacturing facilities (22,722) employ fewer than 50 people, emitting 33.4 tons per employee on average, but the largest 1,448 facilities with more than 250 employees emitted slightly less on average, at about 29 tons of CO₂ per employee. That implies that the threshold would be reached at the facility size of around 900 employees. However, the energy use per employee declines rapidly at the very largest facilities. The overall average annual CO₂ emissions were only 1,824 tons per facility in 2002, but the average for the 858 facilities with 250–499 employees was more than 18,000 tons (52 tons per employee), close to 15,000 tons for the 398 facilities of 500–999 employees (22 tons per employee), and close to 22,000 tons for the remaining 192 facilities with more than 1,000 employees (14 tons per employee).

At the CO₂ emission rate of 13.64 tons per employee for the very largest size category, a facility would have to count more than 1,833 employees to cross the 25,000-ton threshold. Since the available data does not break down further the number and energy intensity of facilities larger than 1,000 employees, it is difficult to assess what portion of the 192 facilities in this category might exceed the 25,000-ton threshold. In the absence of further information, this report has listed all the 192 facilities in that size category as affected by the 25,000-ton threshold, even though that is clearly somewhat excessive. Based on overall industry averages, a food manufacturing facility would reach the threshold at about 1,800 employees, but this average value is of limited use due to the great variability in energy use among the various food industries.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would include facilities with 250–499 employees (average emissions of 18,214 tons per year) and increase the number of facilities regulated to 1,448, which is 5.2% of the total number of facilities. The amount of CO₂ emissions that would be subject to regulation under this lower threshold would increase 51% of the total for the industry. Additional facilities of even smaller size (<250) would be regulated under this lower threshold because of the contribution of relatively energy intensive food industries such as sugar manufacturing.

5.01.01. Wet corn milling (NAICS code 311221)

The 33 wet corn mills that employ more than 50 people each would be regulated under a 25,000-ton rule. This is a little more than half of the 61 facilities in this industry. Yet, this level of regulation would represent 14.6 million tons of the total of 14.7 million tons of CO₂ emitted by the industry in 2002, or 99%.

Facilities that employ fewer than 50 people are the largest single segment by number of facilities (28), but counts only 4.2% of employment in the industry. This segment of the industry emits 277 tons per employee on average, but the remainder of the industry emits on average in excess of 1,688 tons of CO₂ per employee. CO₂ emissions per employee seem to vary significantly in this industry depending on how large the facility is. The average annual CO₂ emissions exceeded 240,000 tons per facility in 2002, but the average for the facilities with 250–499 employees was about 824,000 tons, while it was only a tenth as large for facilities of 50–99 employees.

At the industry-average CO₂ emission rate of 1,629 tons per employee, a facility would have to count only sixteen employees to cross the 25,000-ton threshold. However, since the average emission rate for the smaller facilities is much lower than the overall average, it would be reasonable to anticipate that facilities approaching 50 employees may exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not increase the number of facilities regulated because the average annual emissions among the smallest facilities (<50 employees) is still below that threshold, at 3,717 tons per year. However, it would take a facility of about 36 employees to cross that threshold at the average rate of emissions for this size category, which might include some of those 28 facilities, even though the average number of employees in that class is only thirteen.

5.01.02. “Sugar” (NAICS codes 31131x)

The “sugar” category of industry includes the three sub-categories of sugarcane mills, cane sugar refining, and beet sugar manufacturing.

The 44 sugar facilities that employ more than 100 people each would be regulated under a 25,000-ton rule. This is about half of the 87 facilities in this industry. This level of regulation would represent 4.6 million tons of the total of almost 5 million tons of CO₂ emitted by the industry in 2002, or 92%.

Facilities that employ fewer than 50 people are the largest single segment by number of facilities (36), but counts only 3.8% of employment in the industry. Unlike wet corn milling, the smallest sugar facilities (<50 employees) have a higher average emission rate than the rest of the industry, or 571 tons per employee compared to an average of 332 tons of CO₂ per employee for the remainder of the industry. Average annual CO₂ emissions are the greatest for facilities with 250–499 employees, at close to 132,000 tons, but are 8,793 tons on average for facilities with fewer than 50 employees.

At the industry-average CO₂ emission rate of 341 tons per employee, a facility would have to count only 74 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size category is particularly low at 188 tons per employee, indicating a much higher threshold of 134 employees.

This is in stark contrast with the much higher average emission rate for the smallest size category (<50 employees) noted above, which would imply a threshold of only 44 employees. Similarly, the average emissions for the size category of 100–249 employees are 476 tons per employee, suggesting a threshold of only 53 employees. Such nonlinearity makes it difficult to pinpoint a narrow threshold range, but it would seem reasonable to anticipate that facilities of 50–100 employees would approach or exceed the threshold level of 25,000-tons.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ would affect all facilities to of more than fifty employees. This is because the average annual emissions among the smallest facilities (<50 employees) approaches 9,000 tons. Since the average number of employees per facility in that size category is 15 and it would take a facility of only 18 employees to cross the 10,000-ton threshold at the average rate of emissions, it is likely that some portion of the 36 facilities in this size category would be affected.

5.01.03. Fruit & vegetable canning (NAICS code 311421)

Among fruit and vegetable canners, only the three facilities (from a total of 782) that employ more than 1,000 people each would be regulated under a 25,000-ton rule. Yet, in 2002, these three facilities represented 230,000 tons of the total of 2.06 million tons of CO₂ emitted by the industry that year, or 11%.

Most of these canning facilities (516) employ fewer than 50 people, emitting 26.7 tons per employee on average, but the largest three facilities emit on average 52 tons of CO₂ per employee. While the average annual CO₂ emissions were 2,637 tons per facility in 2002, the average for the 44 facilities with 250–499 employees was more than 10,000 tons, more than 18,000 tons for the 15 facilities of 500–999 employees, and in excess of 76,000 tons for the remaining three facilities with more than 1,000 employees.

At the industry-average CO₂ emission rate of 35 tons per employee, a facility would have to count more than 716 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class (500–999 employees) is slightly lower than the industry average, at 28.7 tons per employee, indicating a threshold size of 871 employees. Therefore, it seems reasonable to anticipate that any facility approaching 900 employees may exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would include facilities with 250–499 employees (average emissions of 10,490 tons per year) and increase the number of facilities regulated to 62, which is 7.9% of the total number of facilities. The amount of CO₂ emissions that would be subject to regulation under this lower threshold would increase to 970,000 tons, which is 47% of the total for the industry. However, since the average emission level in this size class is relatively close to the 10,000-ton threshold, it is likely that the actual number of regulated facilities would be smaller than 62. It follows that it is not very likely that additional facilities of even smaller size (<250) would be regulated under this lower threshold because the average emission rate for the 111 facilities with 100–249 employees is 34.2 tons per employee, with average annual emissions of 5,414 tons.

5.02. Beverage and tobacco (NAICS code 312)

The beverage and tobacco industry covers six sub-categories for beverages, such as soft drinks, breweries, and distilleries, and three tobacco-related categories.

It is inherently problematic to treat beverage and tobacco manufacturing as a single industry category for the purpose at hand, mostly because the types of energy and the pattern of energy use differ significantly between beverage and tobacco manufacturers. For example, coal is by far the primary fossil energy source for tobacco facilities while natural gas is the largest source of fossil energy for beverage manufacturers. Also, large beverage facilities (500+ employees) use more energy per employee on average than tobacco facilities of the same size while the average energy use by smaller tobacco facilities (100–500 employees) is more than

twice the average for beverage facilities of the same size. Subsequently, average CO₂ emissions per employee for the various size classes of facilities differ significantly between the two industry categories.

For these reasons, it is not reasonable to generalize about the impact of a 25,000-ton CO₂ threshold on beverage and tobacco manufacturers as a single industry class. Despite limited availability of data and apparent inconsistency in reported values on employment and energy use for the two individual industry categories (see section 3), it is more useful to estimate CO₂ emissions and likelihood of regulation individually for each industry category.

5.02.01. Beverage product manufacturing (NAICS codes 3121xx)

Among beverage manufacturers, the 37 facilities that employ more than 500 people each would be regulated under a 25,000-ton rule. This is only 1.3% of the total number of establishments in this industry of 2,903 facilities. This level of regulation would represent 1.7 million tons of the total of 3.3 million tons of CO₂ emitted by the industry in 2002, or 51%.

Most beverage manufacturing facilities (2,361) employ fewer than 50 people, emitting 15.3 tons per employee on average, but the largest 37 facilities emitted on average in excess of 48 tons of CO₂ per employee. While the average annual CO₂ emissions were only 1,149 tons per facility in 2002, the average for the 29 facilities with 500–1000 employees was about 40,000 tons, and in excess of 68,000 tons for the remaining eight facilities with more than 1,000 employees.

At the industry-average CO₂ emission rate of 24.5 tons per employee, a facility would have to count more than 1,020 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size category, at 41.9 tons per employee, implies a threshold of 597 employees, and the average emission rate for facilities with 500–1000 employees, still higher at 52.2 tons per employee, suggests a threshold of 479 employees. Smaller facilities have much lower emission rates per employee, indicating that 500-employee facilities and larger exhibit decisively more CO₂ emissions than smaller facilities, and that this is also the point where a beverage facility may exceed the 25,000-ton threshold. These larger facilities are very large breweries, wineries, and soft drink manufacturers.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not necessarily cover a large number of additional facilities. In addition to the 37 facilities with more than 500 employees, there were another 84 facilities with 250–499 employees from a total of 2,903 facilities. On average, those 84 plants had an average of 358 employees in 2002 and emitted 5,599 tons each at an average emission rate of 15.6 tons per employee, implying a threshold number of 1,600 employees, which is far outside the range of the size category. Somewhere in the range 360 and 500 employees, the average emission rate increases dramatically, not only to exceed 10,000 tons per year but even 25,000 tons per year. This is probably explained further by differences between sub-sectors of the beverage industry where larger facilities of one kind, such as breweries, have far higher emission rates than smaller facilities in a different sub-sector, such as bottled water manufacturing.

5.02.02. Tobacco product manufacturing (NAICS codes 3122xx)

Among tobacco manufacturers, the 21 facilities that employ more than 250 people each would be regulated under a 25,000-ton rule. This is 18.4% of the total number of establishments in this industry of 114 facilities. This level of regulation would represent 1.08 million tons of the total of 1.24 million tons of CO₂ emitted by the industry in 2002, or 87%.

Most tobacco manufacturing facilities (68) employ fewer than 50 people, emitting 17.1 tons per employee on average, but the largest 21 facilities (>250) emitted on average in excess of 51 tons of CO₂ per employee. While the average annual CO₂ emissions were only 10,832 tons per facility in 2002, the average for the 11 facilities with 250–500 employees was approaching 29,000 tons, close to 35,000 tons for the four facilities

of 250–500 employees, and in excess of 103,000 tons for the remaining six facilities with more than 1,000 employees.

At the industry-average CO₂ emission rate of 50.3 tons per employee, a facility would have to count more than 498 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class (250–499 employees) is 72.6 tons per employee, making it reasonable to expect that any tobacco facility with more than 345 employees may exceed the 25,000-ton threshold. This report has included all 11 plants with 250–499 employees as exceeding the 25,000-ton threshold. However, even though on average they do emit at a rate higher than the threshold, it is very likely that some of those plants would fall below that level.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would almost certainly include all facilities with more than 250 employees, but would not necessarily expand coverage much beyond that. In 2002, there were another ten facilities with 100–249 employees but their average emissions were only 9,944 tons per year. Some of those plants are bound to have exceeded 10,000 tons per year but all ten plants accounted for only 99,000 tons of CO₂ compared to the 1,075,000 tons already covered under larger facilities. Nonetheless, since it is likely that not all larger facilities (>250) would be covered under the 25,000-ton threshold, a lower threshold might easily increase actual coverage by 100,000 tons of CO₂ per year, or more.

5.03. Textile mills (NAICS code 313)

Textile mills include yarn, thread, and fabric mills, textile and fabric finishing, and fabric coating. There are twelve sub-categories of industry within this category but data on energy use, employment distribution, and number of facilities are available only for the general category of textile mills.

Based on data available for textile mills in general, the 82 facilities that employ more than 500 people each would be regulated under a 25,000-ton rule. This is only 2.1% of the total number of establishments in this industry of 3,919 facilities. Yet, this level of regulation would represent 2.5 million tons of the total of 6.6 million tons of CO₂ emitted by the industry in 2002, or 38%.

Most textile mills (2,794) count fewer than 50 employees, emitting twelve tons per employee on average, but the largest 82 facilities emitted on average in excess of 36 tons of CO₂ per employee. While the average annual CO₂ emissions were only 1,682 tons per facility in 2002, the average for the 70 facilities with 500–999 employees was more than 27,000 tons, and in excess of 47,000 tons for the remaining twelve facilities with more than 1,000 employees.

At the industry-average CO₂ emission rate of 28.1 tons per employee, a facility would have to count more than 889 employees to cross the 25,000-ton threshold. Since the average emission rate for facilities in that size range (500–999 employees) is considerably higher, at 41.2 tons per employee, any facility of more than 607 employees would be considered likely to approach the 25,000-ton threshold. Therefore, it is plausible that some of the 70 facilities with 500–999 employees would fall below the threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would almost certainly include all facilities with more than 500 employees and probably some of the 202 plants with 250–499 employees, with average emissions of 9,665 tons per year in 2002 and total emissions a bit under 2 million tons.

5.04. Textile product mills (NAICS code 314)

Textile product mills include facilities that manufacture items such as carpets, curtains, canvas, rope, tire fabric and other miscellaneous textile products. There are eight sub-categories of industry within this

category but data on energy use, employment distribution, and number of facilities are available only for the general category of textile product mills.

Based on data available for textile product mills in general, the seven facilities that employ more than 1,000 people each would be regulated under a 25,000-ton rule. This is only 0.1% of the total number of establishments in this industry of 7,270 facilities. Yet, this level of regulation would represent 234,000 tons of the total of 1.76 million tons of CO₂ emitted by the industry in 2002, or 13%.

Most textile product mills (6,566) count fewer than 50 employees, emitting 3.6 tons per employee on average, while the largest seven facilities emitted on average in nearly 27 tons of CO₂ per employee. While the average annual CO₂ emissions were only 242 tons per facility in 2002, the average for the seven largest facilities was more than 33,000 tons.

At the industry-average CO₂ emission rate of 9.6 tons per employee, a facility would have to count more than 2,600 employees to cross the 25,000-ton threshold. However, since the few largest facilities have significantly higher average emission rates than the industry average, any facility of more than 1,000 employees would be considered likely to approach the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would include facilities with 500–999 employees (average emissions of 12,323 tons per year) and would increase the number of facilities regulated to 43, which is still only 0.6% of the total number of facilities. However, the amount of CO₂ emissions that would be subject to regulation under this lower threshold would increase to 677,000 tons, which is 38% of the total for the industry. It is unlikely that many additional facilities of even smaller size would be regulated under this lower threshold because the average emission rate for the 106 facilities with 250–499 employees is just less than 18 tons per employee, with average annual emissions of 6,586 tons.

5.05. Apparel (NAICS code 315)

The apparel class of industry encompasses knitting mills and “cut & sew” facilities that manufacture clothing and accessories, including fur and leather apparel. There are twenty-four sub-categories of industry within the apparel category but data on energy use, employment distribution, and number of facilities are available only for the general apparel category.

Based on data available for apparel manufacturing in general, not a single establishment in this industry would be regulated under a 25,000-ton rule. There were only nine apparel manufacturing facilities in the largest EIA size category in 2002 (1,000+ employees), from an industry total of 13,041 facilities. The average size of these nine largest facilities was 1,292 employees, emitting 1.51 tons of CO₂ per employee, or 1,956 tons CO₂ per establishment. Since the Census Bureau reports no facilities in this industry larger than 2,500 employees, it is virtually impossible that any single facility would emit more than 25,000 tons CO₂ per year, unless its emission rate far exceeded the average rate for the industry. Most apparel manufacturing locations count fewer than 50 employees, and the average annual CO₂ emissions were only 70 tons per facility in 2002.

At the industry-average CO₂ emission rate of 2.66 tons per employee, a facility would have to count about 9,400 employees to cross the 25,000-ton threshold, and since the few largest facilities have significantly lower average emission rates than the industry average, that theoretical employee threshold would be exceedingly large.

Due to the relatively low emissions levels for apparel manufacturing facilities, even a lower threshold of 10,000 tons CO₂ per year would not be likely to trigger any regulation in this industry.

5.06. Leather and allied products (NAICS code 316)

This industry category covers ten sub-categories, distributed among the three areas of tanning and finishing of leather and hide, footwear manufacturing, and luggage and other leather goods. Data on energy use, employment distribution, and number of facilities are not available individually for the sub-categories.

Based on data available for the general category, not a single establishment in this industry would be regulated under a 25,000-ton rule. There were only three manufacturing facilities in the largest EIA size category in 2002 (>1,000 employees), from an industry total of 1,530 facilities. The average size of these three largest facilities was 1,110 employees, emitting 3.44 tons of CO₂ per employee, or 3,816 tons CO₂ per establishment. Since there are three facilities in this category emitting a total of only 11,448 tons, it is impossible that any single facility would emit more than 25,000 tons CO₂ per year. Most facilities in this industry count fewer than 50 employees, and the average annual CO₂ emissions were only 139 tons per facility in 2002.

At the industry-average CO₂ emission rate of 4.76 tons per employee, a facility would have to count about 5,250 employees to cross the 25,000-ton threshold. However, since the few largest facilities have lower average emission rates than the industry average, theoretically, only facilities of more than 7,200 employees would be considered likely to approach the 25,000-ton threshold, which far exceeds the size of even the largest leather manufacturing facilities.

Due to the relatively low emissions levels in this industry as a whole, even a lower threshold of 10,000 tons CO₂ per year would not be likely to trigger any regulation.

5.07. Wood products (NAICS code 321)

The wood manufacturing industry includes fourteen sub-categories under the NAICS classification system. EIA reported energy use per employee in 2002 for five of these under the combined category “Veneer, plywood, and engineered woods,” another seven categories under the classification “Other wood products,” and finally the single sub-category of sawmills. Wood preservation is the only sub-category not covered by published EIA energy-use data.

Fossil fuel use per employee varies significantly across the different sub-sectors, and particularly between different facility size categories within an industry segment. For example, EIA reports that the average total fuel use for the segment “veneer, plywood, and engineered woods” is 1.6 billion Btus per employee, with a high of 3.7 billion Btus for facilities of 100–249 employees and a low of merely 0.1 billion Btus per employee for facilities of fewer than 50 employees. While the categories of “Other wood products” and sawmills show some size-dependent variation in energy use, it is not nearly as dramatic.

A special consideration for wood products is the large amount of wood chips (waste wood) used as fuel. Only about 24% of the fuel used in the industry (excluding electricity) is derived from fossil fuels. The carbon emissions from use of wood fuel are excluded in the calculations in this report, in accordance with the convention of assuming a virtually closed-loop use of biomass.

Similar to food production, the observed average energy use and CO₂ emissions for the industry as a whole may not be representative of individual sub-categories. For example, the average CO₂ emissions per employee in sawmills are about four times greater than the average for “Other wood products,” and CO₂ emissions per employee in “Veneer, etc.” are twice the average for sawmills. Since all sub-categories of the industry, except one, are represented in the three groups covered by EIA reported data, it seems reasonable to only discuss those sub-groups individually and avoid potentially misleading conclusions about emissions-thresholds for the industry as whole. The implied thresholds of the wood industry as a whole can still be seen in Table 5.

5.07.01. Sawmills (NAICS code 321113)

None of the 3,807 sawmills in the country would be regulated under a 25,000-ton rule.

Most sawmills (3,265) employ fewer than 50 people, emitting 3.7 tons per employee on average, but the largest two facilities emit on average in excess of 24 tons of CO₂ per employee. Energy use per employee, and thus CO₂ emissions per employee, grows fast with increasing size, to a point where the energy profile of the largest sawmills has little in common with the rest of the industry. While the average annual CO₂ emissions were only 252 tons per facility in 2002, the average for the two largest facilities with 500–999 employees was more than 15,000 tons. There were no sawmills with more than 1,000 employees.

At the industry-average CO₂ emission rate of 10.1 tons per employee, a facility would have to count more than 2,488 employees to cross the 25,000-ton threshold but the average emission rate for the largest relevant size class (500–999 employees) is 24.2 tons per employee, indicating a threshold size of 1,035 employees. There were no sawmills of such size in 2002.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would cover the two sawmills in the 500–999 employee size category, representing 959 tons of CO₂, which was 3% of sawmill emissions in 2002. Since facilities of 250–499 employees have much lower average emission rates (14.3 tons per employee), there is no strong reason to assume that facilities of fewer than 500 employees would be likely to exceed a 10,000-ton threshold.

5.07.02. “Veneer, plywood, and engineered wood” (NAICS codes 32121x)

As the name implies, this industry category covers veneer, plywood, engineered wood members, trusses, and reconstituted wood products. Data on energy use are not available individually for the various sub-categories.

Based on the average emission levels of facilities within each size category, not a single establishment in this industry would be regulated under a 25,000-ton rule. Most facilities in this industry count fewer than 50 employees, and the average annual CO₂ emissions for the industry were 1,179 tons per facility in 2002. The largest plants in this industry fall in the category of 500–999 employees. There were only nine facilities in this size category from an industry total of 1,916 plants. The average size of these nine largest establishments was 576 employees, emitting 16.05 tons of CO₂ per employee, or 9,245 tons CO₂ per establishment.

At the industry-average CO₂ emission rate of 19.89 tons per employee, a facility would have to count about 1,257 employees to cross the 25,000-ton threshold, which is larger than any plant in this industry in 2002.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year might affect some facilities because the average emissions among the nine largest plants is so close to the 10,000-ton threshold. However, those nine plants accounted for only 83,000 tons of CO₂ from a category total of 2.26 million tons in 2002.

5.07.03. “Other wood products” (NAICS codes 3219xx)

This industry category covers millwork (such as flooring, doors and windows), wood containers and pallets, manufactured homes, prefabricated wood buildings, and all other miscellaneous wood products. Data on energy use are not available individually for the various sub-categories.

Based on the average emission levels of facilities within each size category, not a single establishment in this industry would be regulated under a 25,000-ton rule. The facilities that have the highest average CO₂ emissions per employee are the 32 establishments with 500–999 employees. Their average annual emissions were 6,538 tons in 2002. The nine facilities with more than 1,000 employees had annual average emissions of 3,889

tons. Most facilities in this industry, or 9,532 out of 10,940 facilities, count fewer than 50 employees, and the average annual CO₂ emissions for the industry were 72 tons per facility in 2002.

At the industry-average CO₂ emission rate of 2.49 tons per employee, a facility would have to count more than 10,000 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class (>1,000 employees) is lower, at 1.52 tons per employee, indicating a theoretical threshold size of more than 16,000 employees. On the other hand, facilities with 500–999 employees have a much higher average emission rate per employee, at 10.10 tons, indicating a threshold size of 2,475 employees. Since there is such a large difference in average emission rates per employee between the size categories, it is difficult to pinpoint the employment size most likely to cause average emissions to exceed 25,000 tons, but only a facility of “several thousand” employees would be considered likely to exceed the 25,000-ton threshold, which probably exceeds the size of any facility in the industry.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not be expected to trigger emissions regulation. The 32 facilities with 500–999 employees emit on average 6,538 tons CO₂ per year, but facilities in other size categories have significantly lower average emissions. It is possible, but somewhat improbable, to emit 10,000 tons per year with fewer than 1,000 employees.

5.08. Paper (NAICS code 322)

The paper industry includes twenty sub-categories under the NAICS classification system. EIA reported energy use per employee in 2002 for four of these individually. These are the paper mills: pulp mills, newsprint mills, paper mills other than newsprint, and paperboard mills. Paper mills are generally more energy intensive than the rest of the paper industry and represent higher than average CO₂ emissions per employee.

There are too many inconsistencies and missing data to report reliable CO₂ thresholds for three of the four sub-categories above. EIA did not provide fuel use per employee for the smallest facility-size category for non-newsprint paper mills and paperboard mills, due to uncertainty in estimation. While it should be possible to derive some estimate of these values based on reported total fuel use in the industry and reported fuel use per employee in the other size categories, this was confounded by the apparent inconsistency between the product of reported fuel use per employee and total number of employees on one hand, and independently reported total fuel use on the other. For example, the sum of fuel use in paperboard mills across all size categories larger than 50 employees (the product of energy use per employee in each class and the number of employees in each class), yields a figure that is higher than the implied total for the industry (product of average industry energy use per employee and total number of employees in industry), which again does not quite match EIA's independently reported total fuel use for the industry. As noted in section 3.03, this inconsistency is introduced by apparent disagreement between EIA's calculated fuel use per employee and Census data on the number of employees in each industry. This is impossible to clarify further because EIA reports total energy use per industry and fuel use per employee but does not provide the actual Census data used, except to say that 2002 Economic Census data were used.

As for newsprint mills, EIA reports fuel use for mills with 50–99 employees even though the Census data indicate no such facilities exist. Likewise, fuel use for mills with 500–999 employees is reported as none even though Census data indicate the existence of one such facility (EIA does not claim to withhold the information for privacy concerns).

As a result, it is highly problematic to draw conclusions about thresholds for the three categories other than pulp mills. The following are general conclusions about the paper industry as a whole, and then pulp mills in particular.

A special consideration for paper mills is the large amount of wood chips used as fuel as well as the pulping liquor or black liquor, which is an energy source unique to the paper mill industry. Only about 40% of the fuel used in the industry (excluding electricity) is derived from fossil fuels, while about 38% comes from wood and 15% from pulping/black liquor. As with the wood industry, the carbon emissions from use of wood fuel and black liquor is excluded in the calculations in this report, in accordance with the convention of assuming a virtually closed-loop use of biomass.

As noted above, the observed average energy use and CO₂ emissions for the industry as a whole may not be representative of individual sub-categories. For example, the average CO₂ emissions per employee in pulp mills are about 85% greater than the paper industry average and average emissions per pulp mill are about five times greater than the average per facility across the whole industry.

Among all paper manufacturing establishments, the 376 facilities that employ more than 250 people each would be regulated under a 25,000-ton rule. This is 6.8% of the total number of establishments in this industry of 5,501 facilities. This level of regulation would represent 50.2 million tons of the total of 58.5 million tons of CO₂ emitted by the industry in 2002, or 86%. In addition, nine smaller pulp mills of 100–249 employees would be expected to reach the threshold, representing an additional 257,000 tons of CO₂.

Most paper manufacturing facilities (3,111) employ fewer than 50 people, emitting 11.3 tons per employee on average, but the largest 376 facilities emit on average in excess of 241 tons of CO₂ per employee. While the average annual CO₂ emissions were 10,630 tons per facility in 2002, the range was tremendously wide, from an average of 187 tons for facilities with fewer than 50 employees, to more than 350,000 tons for facilities of more than 1,000 employees.

At the industry-average CO₂ emission rate of 119 tons per employee, a facility would have to count only 211 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class (100–249 employees) is 34.2 tons per employee, indicating a threshold size of 732 employees, which falls outside the size category. Since facilities with 250–499 employees have much higher average emission rates (160 tons per employee) and facilities of 500–999 employees are higher still (312 tons per employee), indicating a threshold size of only 80 employees, it is difficult to identify a single specific facility size likely to exceed the 25,000-ton threshold, although a crude estimate might be around 300 employees. In this context, it would be most important to distinguish between paper mills and other less carbon-intensive paper industries.

Based on the average emission levels of facilities within each size category, and the above discussion, a lower threshold of 10,000 tons CO₂ per year might trigger emissions regulation for facilities with more than 200 employees, but that is a very rough estimate.

5.08.01. Pulp mills (NAICS code 322110)

Among all 32 pulp mills in the country, the 22 mills that employ more than 100 people each (69% of facilities) would be regulated under a 25,000-ton rule. This level of regulation would represent 1.69 million tons of the total of 1.70 million tons of CO₂ emitted by the industry in 2002, or 99%.

Pulp mills come in all sizes but the level of CO₂ emissions increases rapidly with operating scale. The range of CO₂ emissions varies tremendously with size, from an average of 41.6 tons per employee and average annual emissions of 1,235 tons for the seven pulp mills of fewer than 50 employees, to 235 tons per employee and more than 170,000 tons annually for each of the four pulp mills with 500–999 employees.

At the industry-average CO₂ emission rate of 220.4 tons per employee, a facility would have to count only 114 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class is lower, at 194 tons per employee and 28,558 tons per pulp mill. This indicates a threshold size of

129 employees. Similar to the paper industry as a whole, it is difficult to identify a single specific facility size likely to exceed the 25,000-ton threshold because the average emission rate per employee rises very significantly from one size category to the next. Pulp mills with 50–99 employees have a far lower average emission rate, at 29.4 tons per employee and 2,292 tons per pulp mill. Therefore, it is very likely that some of the nine pulp mills of 100–249 employees (with an average size of 147 employees) would not reach annual emissions of 25,000 tons.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not be expected to result in much additional emissions regulation, because average emissions for mills below 100 employees fall off precipitously. However, it would almost certainly cover all mills with more than 100 employees.

5.09. Printing and related activities (NAICS code 323)

Printing and related support activities cover twelve sub-categories but EIA publishes fuel use data for them only as a single group.

There were 37,532 printing facilities in the country in 2002 and none of those would have been expected fall under the 25,000-ton threshold.

The range of CO₂ emissions varies from an average of 2.75 tons per employee and average annual emissions of 22 tons for the 34,421 printing facilities of fewer than 50 employees, to 8.24 tons per employee and more than 10,989 tons annually for each of the 21 facilities with more than 1,000 employees.

At the industry-average CO₂ emission rate of 3.50 tons per employee, a facility would have to count about 7,143 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class is much higher, indicating a threshold size of 3,034 employees. Therefore, it is reasonable to anticipate that any printing facility approaching 3,000 employees may exceed the 25,000-ton threshold, but since the average size of the 21 largest printing facilities is only 1,333 employees, it is unlikely that any facility would be affected.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in additional emissions regulation. Many of the 21 printing facilities employing more than 1,000 people (0.06% of facilities), would be regulated under a 10,000-ton rule. All 21 included, this level of regulation would represent 231,000 tons of the total of 2.5 million tons of CO₂ emitted by the industry in 2002, or 9%. However, since the average emissions per facility are merely 10,989 tons per year, it is likely that some of these plants would fall under the lower threshold of 10,000 tons.

5.10. Petroleum and coal products (NAICS code 324)

Petroleum and coal products cover petroleum refineries, asphalt products, petroleum lubricants, and “all other petroleum and coal products.” In 2002, petroleum refineries accounted for 30% of all manufacturing industry CO₂ emissions.

EIA has published fuel use data for two out of five sub-categories: petroleum refineries and “other petroleum and coal products.” Both industry categories use significant amounts of feedstock fuels but the composition of these feedstock fuels is not disclosed in EIA’s MECS data tables. For example, petroleum refineries were reported to use 3.3 quads of nonfuel energy in 2002 under the category of “other,” which exceeds their fuel-energy use of about 3 quads.¹⁷ Since the composition of this fuel use is unknown, this report relied on a separate EIA report of CO₂ emissions from refineries in 2002, to formulate a comprehensive emission coef-

¹⁷ U.S. EIA, 2002 Manufacturing Energy Consumption Survey (MECS), 2002 Data Tables, Table 2.2.

ficient that includes feedstock emissions (but excludes process emissions and flaring).¹⁸ Because EIA did not report individual CO₂ emissions for the category of “other petroleum and coal products,” it was not feasible to accurately formulate a separate emission coefficient for this category. Subsequently, no estimation can be made here of relative thresholds for this industry category individually.

Refineries heavily influence industry-wide figures. Even though they number only 198 out of the total of 2,262 facilities in the petroleum industry, they accounted for 91% of the industry’s CO₂ emissions in 2002.

5.10.01. Petroleum and coal products – entire industry (NAICS code 324)

Based on average emissions characteristics across all 2,262 petroleum and coal product facilities in the country, only 369 of them (16%), those employing more than 50 people, would be regulated under a 25,000-ton rule. This level of regulation would represent 272.5 million tons of the total of 280.2 million tons of CO₂ emitted by the industry in 2002, or 97%. Actual regulation might be slightly different, as discussed below, because the 55 refineries that count fewer than 50 employees (average of 48,181 tons per refinery and a total of 2.65 million tons) would also exceed the threshold. On the other hand, some of the 131 nonrefinery facilities with 50–99 employees (average of 26,148 tons per plant and a total of 3.95 million tons) would be expected to fall below the threshold.

The range of CO₂ emissions varies from an average of 422 tons per employee and average annual emissions of 4,047 tons for the 1,893 facilities of fewer than 50 employees, to 4,859 tons per employee and an average of 5.96 million tons annually for each of the 13 facilities (all are refineries) with more than 1,000 employees.

At the industry-average CO₂ emission rate of 2,716 tons per employee, a facility would have to count only ten employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class is much lower, indicating a threshold size of 60 employees. Therefore, it is reasonable to anticipate that a petroleum and coal product facility exceeding 50 employees may exceed the 25,000-ton threshold. Refineries are the exception, as discussed below, because virtually any refinery would be expected to emit more than 25,000 tons of CO₂.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in additional emissions regulation except that all 131 nonrefinery facilities with 50–99 employees would now almost certainly exceed the threshold.

5.10.02. Petroleum refineries (NAICS code 324110)

As noted above, all 198 petroleum refineries in the country would be regulated under either a 25,000-ton or a 10,000-ton rule. Refineries accounted for 30% of all manufacturing industry emissions of CO₂ in 2002, or 254.6 million metric tons.

The range of CO₂ emissions varies from an average of 2,018 tons per employee and average annual emissions of more than 48,000 tons for the 55 refineries of fewer than 50 employees, to 4,859 tons per employee and an average of 5.96 million tons annually for each of the 13 refineries with more than 1,000 employees.

At the lowest CO₂ emission rate of 2,018 tons per employee, based on employee numbers alone, a facility would have to count only 13 employees to cross the 25,000-ton threshold. Yet the average size of refineries in the smallest size category is 24 employees. Therefore, it is virtually certain that any refinery would exceed the 25,000-ton threshold. Clearly, the same is true for a 10,000-ton threshold.

¹⁸ U.S. EIA, 2006(b), Table 2.

5.11. Chemicals (NAICS code 325)

The chemical manufacturing industry covers 34 sub-categories of manufacturing. The industry is second only to petroleum in CO₂ emissions from manufacturing. Chemicals accounted for 211.6 million metric tons CO₂ in 2002, or about 25% of the total for the manufacturing industries.

EIA has published fuel use data for 15 sub-categories individually, and a group of four sub-categories under the title “Pharmaceuticals and medicines.” Similar to the petroleum industry, many of these industries use significant amounts of feedstock fuels. Data on nonfuel and fuel energy use are limited in many instances, making calculations of emission thresholds difficult. For example, data on the energy mix for noncellulosic organic fiber manufacturing are very limited. Only the quantity of natural gas is reported, which amounts to about half of energy use in this industry, while the quantity of electricity, oil, and coal is withheld by EIA¹⁹ Even though EIA reports total CO₂ emissions from this industry elsewhere²⁰ (including electricity), which normally would be enough to formulate an emission coefficient, the fact that total electricity use is withheld means that CO₂ emissions exclusive of electricity use cannot be determined, as is the purpose here. Similar lack of information stood in the way of formulating emission coefficients for another five manufacturing sub-categories: petrochemicals, industrial gases, alkalies and chlorine, ethyl alcohol, and photographic chemicals and related products. Despite these obstacles, some inference can be made about emission thresholds for these industries from the available data. Each will be discussed below.

5.11.01. Chemicals – entire industry (NAICS code 325)

There were 13,189 chemical manufacturing facilities in the country in 2002. Based on average carbon dioxide emissions across the entire industry, the 1,725 facilities with more than 100 employees and another 203 smaller facilities (total of 1,928 or 15%) would be regulated under a 25,000-ton rule. This would represent 184.3 million tons of the total of 211.6 million tons of CO₂ emitted by the industry in 2002, or 87%. A lower emission threshold of 10,000 tons per year would increase the number of facilities affected, from 1,928 to 3,075 facilities. A 10,000-ton threshold would capture 194.2 million tons of emissions, or 92%.

In such a large and varied group of industries, the average energy use and CO₂ emissions for the industry as a whole may not be representative of individual sub-categories. The more energy- and carbon intensive industries will skew upward the average emission levels per employee. For example, the average CO₂ emissions per employee in “pharmaceutical and medicines” are only 7% of the industry average and average emissions for each such facility are less than 16% of the average for the whole industry, making the threshold for this industry group much higher than the industry average. The same is certainly true for many more of the 34 sub-categories in the chemicals industry.

5.11.02. Petrochemicals (NAICS code 325110)

Comprehensive estimates of CO₂ emissions and emissions per employee and facility in petrochemical manufacturing were not achieved due to lack of data. Nonetheless, the available data suggest unequivocally that virtually any petrochemical facility, regardless of size, would exceed the 25,000-ton threshold for CO₂.

The composition of all fuel energy use other than natural gas and waste gas (by-product fuel) was withheld by EIA. From a total of 474 trillion Btus of fuel energy (including net electricity), natural gas accounted for 172 trillion Btus and waste gas another 160 trillion Btus. The relative contribution of net electricity, fuel oil, liquefied petroleum gas (LPG) or natural gas liquids (NGL), and coal is unknown. In addition, EIA reported nonfuel feedstock use of LPG or NGL in the amount of 899 trillion Btus and another 37 trillion Btus of feedstock natural gas.

¹⁹ U.S. EIA, 2002 Manufacturing Energy Consumption Survey (MECS), 2002 Data Tables, Table 2.2.

²⁰ U.S. EIA, 2006(b), Table 2.

Based on fuel energy use of natural gas and waste gas alone, the petrochemical facilities with fewer than 50 employees would emit on average in excess of 50,000 tons of CO₂ per year. It is therefore safe to assume that every petrochemical facility would be subject to emissions regulation under the 25,000-ton threshold.

5.11.03. Industrial gas manufacturing (NAICS code 325120)

Comprehensive estimates of CO₂ emissions and emissions per employee and facility in industrial gas manufacturing were not achieved due to lack of data. Nonetheless, the available data suggest any industrial gas facility with more than 100 employees would exceed the 25,000-ton threshold for CO₂. It is not likely that many of the 555 facilities with fewer than 100 employees, from a total of 568 facilities in the industry, would exceed the threshold.

The composition of all fuel energy use other than natural gas was withheld by EIA, as was the composition of all nonfuel energy use. From a total of 177 trillion Btus of fuel energy, natural gas accounted for less than a third, or 52 trillion Btus. The relative contribution of net electricity and “other” fuel sources is unknown. Also unknown is the relative contribution of nonfuel natural gas and distillates, except that the combined feedstock use energy accounts for another 26 trillion Btus. There appears to be no coal, coke, or fuel oil use in this industry.

Based on the fuel energy use of natural gas alone, the ten industrial gas facilities with 100–249 employees would emit on average in excess of 42,000 tons of CO₂ per year, and the remaining three larger facilities would emit about the same or more. The average emissions of the 23 facilities with 50–99 employees would be in excess of 12,000 tons but fall far short of the 25,000-ton threshold. The vast majority of industrial gas facilities (those with fewer than 50 employees) emit about 5,200 tons per year of CO₂, based on fuel energy use of natural gas alone.

5.11.04. Alkalies and chlorine manufacturing (NAICS code 325181)

Comprehensive estimates of CO₂ emissions and emissions per employee and facility in alkalies and chlorine manufacturing were not achieved due to lack of data. Nonetheless, the available data suggest unequivocally that virtually any such facility, regardless of size, would exceed the 25,000-ton threshold for CO₂.

While the composition of fuel energy use was reported by the EIA, both the total amount and the composition of all nonfuel energy use were withheld.

Based on fuel energy use alone, the alkalies and chlorine manufacturing facilities with fewer than 50 employees would emit on average in excess of 21,000 tons of CO₂ per year but facilities with 50–99 employees would emit more than 50,000 tons per year. Again, the additional emissions from nonfuel energy use are entirely unknown.

5.11.05. Carbon black (NAICS code 325182)

Based on average emissions characteristics across all 25 carbon black manufacturing facilities in the country, 20 of them, those employing more than 50 people (80% of facilities), would be regulated under a 25,000-ton rule. This level of regulation would represent almost all (99.96%) of the 4.9 million tons of CO₂ emitted by the industry in 2002.

The data on energy use in this industry suggest tremendous difference in energy use between facilities of different sizes, ranging from about 200 million Btus per year for facilities of fewer than 50 employees to more than 33 billion Btus per year for facilities of 50–99 employees, and down again to little less than 11 billion Btus per year for facilities of 100–249 employees (there are no facilities larger than 250 employees). The range of CO₂ emissions varies from an average of 25 tons per employee and average annual emissions of 376 tons for the five facilities of fewer than 50 employees, to 4,073 tons per employee and an average of 259,000 tons annually for each of the sixteen facilities with 50–99 employees.

Since the difference in average emissions per employee is so large across the size categories, it is meaningless to discuss industry-wide averages to determine a single size threshold for emissions regulation. The available data imply that no facility under 50 employees would ever be regulated under a 25,000-ton threshold, while every larger facility would be expected to cross that threshold by a wide margin. The same would be true for a 10,000-ton threshold.

5.11.06. Other basic inorganic chemicals (NAICS code 325188)

Based on average emissions characteristics across all 617 facilities in this category, only those 136 employing more than 50 people (22%), would be regulated under a 25,000-ton rule. This level of regulation would represent 6.3 million tons of the total of 7.2 million tons of CO₂ emitted by the industry in 2002, or 88%.

At the industry-average CO₂ emission rate of 156 tons per employee, a facility would have to count 161 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class (100–250 employees) is higher, at 266 tons per employee, indicating a threshold size of 94 employees. Therefore, it is reasonable to anticipate that a facility exceeding 90 employees will approach the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in additional emissions regulation. Since facilities with fewer than 50 employees emit on average 1,833 tons CO₂ per year, it is unlikely that many facilities in this size category emit in excess of 10,000 tons per year.

5.11.07. Cyclic crude and intermediate (NAICS code 325192)

Based on average emissions characteristics across all 39 facilities in this category, only those 13 employing more than 100 people (33%) would be regulated under a 25,000-ton rule. This level of regulation would represent 2.61 million tons of the total of 2.80 million tons of CO₂ emitted by the industry in 2002, or 93%. It is possible that some of the remaining 26 smaller facilities would also be regulated.

At the industry-average CO₂ emission rate of 445 tons per employee, a facility would have to count only 57 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class is lower, indicating a threshold size of 93 employees. Yet, the higher average emission rate for facilities of 100–249 employees implies a threshold size of only 20 employees. It would seem reasonable to expect that a facility of 90–100 employees may already approach the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in emissions regulation for an additional 6 facilities. Total emissions under the cap would be 2.73 million tons, or 97%, under a 10,000-ton rule.

5.11.08. Ethyl alcohol (NAICS code 325193)

Comprehensive estimates of CO₂ emissions and emissions per employee and facility in ethyl alcohol manufacturing were not achieved due to lack of data. Some number of the 69 ethyl alcohol plants would likely exceed the 25,000-ton threshold for CO₂ but the available data does not reveal the approximate share.

The composition of fuel energy use was partially withheld by the EIA. While coal and natural gas use was reported, at a total of 49 trillion Btus, the composition of the remaining 11 trillion Btus between electricity and “other” is unknown.

Based on coal and natural gas use alone, the ethyl alcohol manufacturing facilities with fewer than 50 employees (58 facilities of a total of 69) would emit on average in excess of 20,000 tons of CO₂ per year. Again, the additional emissions from other energy use are entirely unknown and therefore it is unknown what share of these plants might actually exceed the threshold.

5.11.09. Other basic organic chemicals (NAICS code 325199)

Based on average emissions characteristics across all 688 facilities in this category, only those 291 employing more than 50 people (42%) would be regulated under a 25,000-ton rule. This level of regulation would represent 64.3 million tons of the total of 65.7 million tons of CO₂ emitted by the industry in 2002, or 98%. It is possible that some of the remaining 397 smaller facilities would also be regulated.

At the industry-average CO₂ emission rate of 854 tons per employee, a facility would have to count only 30 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class (<50 employees) is considerably lower, at 241 tons per employee, indicating a threshold size of 104 employees. The average emission rate for the next size category (50–99 employees) is much higher, at 602 tons per employee. It would seem reasonable to expect that a facility of 40 employees may already exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in additional emissions regulation. Facilities with fewer than 50 employees emit on average 3,420 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 42 employees would be expected to exceed a 10,000-ton threshold. Therefore, it is possible that some of the 397 facilities in this group, whose average size is 14 employees, would exceed that level.

5.11.10. Primary production of plastics material and resin (NAICS code 325211)

Based on average emissions characteristics across all 688 facilities in this category, only those 159 employing more than 100 people (23%) would be regulated under a 25,000-ton rule. This level of regulation would represent 46.3 million tons of the total of 49.4 million tons of CO₂ emitted by the industry in 2002, or 94%. It is unlikely that any of the remaining 529 smaller facilities would also be regulated.

At the industry-average CO₂ emission rate of 731 tons per employee, a facility would have to count only 35 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class (<50 employees) is considerably lower, at 141 tons per employee, indicating a threshold size of 178 employees. The average emission rate for the next size category (50–99 employees) is somewhat higher, at 185 tons per employee, indicating a threshold of 135 employees. It would seem reasonable to expect that only facilities of more than 100 employees may exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year might result in emissions regulation from an additional 148 facilities. Facilities with between 50 and 100 employees emit on average 12,726 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 54 employees would be expected to exceed a 10,000-ton threshold. Therefore, it is likely that many of the facilities in this group would exceed that level.

5.11.11. Synthetic rubber (NAICS code 325212)

Based on average emissions characteristics across all 157 facilities in this category, only those 27 employing more than 100 people (17%) would be regulated under a 25,000-ton rule. This level of regulation would represent 2.2 million tons of the total of 2.40 million tons of CO₂ emitted by the industry in 2002, or 91%. It is not likely that many of the remaining 130 smaller facilities would also be regulated.

At the industry-average CO₂ emission rate of 251 tons per employee, a facility would have to count 100 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class (100–249 employees) is slightly higher, at 297 tons per employee, indicating a threshold size of 84 employees. The average emission rate for the next smaller size category (50–99 employees) is considerably lower, at 166 tons per employee, indicating a threshold of 150 employees. It would seem reasonable to expect that only facilities of more than 100 employees may approach the 25,000-ton threshold. Also, it is entirely possible that not all facilities of more than 100 employees would be regulated.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in emissions regulation from an additional 18 facilities. Facilities with 50–99 employees emit on average 11,237 tons CO₂ per year. Therefore, it is likely that a majority of the facilities in this group would exceed 10,000 tons per year.

5.11.12. Noncellulosic organic fiber (NAICS code 325222)

Comprehensive estimates of CO₂ emissions and emissions per employee and facility in noncellulosic organic fiber manufacturing were not achieved due to lack of data. Nonetheless, the available data suggest that any such facility with more than 500 employees (16 out of 94) would exceed the 25,000-ton threshold for CO₂. Many of the nine facilities with 250–499 employees might also exceed the same threshold.

The composition of fuel energy use was partially withheld by the EIA. While natural gas use was reported, at 30 trillion Btus, and “other” fuel use at 3 trillion Btus, the composition of the remaining 31 trillion Btus between electricity, residual oil, and coal is unknown. The composition of the additional 3 trillion Btus of nonfuel energy is also ambiguous.

Based on natural gas fuel use alone, industry facilities with 500–999 employees would emit on average in excess of 50,000 tons of CO₂ per year. On the other hand, facilities with 250–499 employees would emit in excess of 23,000 tons CO₂ per year on average from their use of natural gas fuel. Again, the additional emissions from other non-electricity energy use are unknown.

Three conclusions can be drawn. One is that every facility with more than 500 employees would be subject to emissions regulation under a 25,000-ton threshold. The second conclusion is that since facilities with fewer than 50 employees have very low average emissions from fuel use of natural gas (67 tons per year), it is virtually impossible that any such facility would exceed the 25,000-ton threshold, even considering the unknown additional emissions from coal and oil. Finally, some of the nine facilities with 250–499 employees could have average emissions exceeding 25,000 tons CO₂ but this is highly uncertain due to lack of information on the use and composition of nongas fuel.

5.11.13. Nitrogenous fertilizer (NAICS code 325311)

Based on average emissions characteristics across all 143 facilities in this category, only those 27 employing more than 50 people (19%) would be regulated under a 25,000-ton rule. This level of regulation would represent 9.91 million tons of the total of 10.16 million tons of CO₂ emitted by the industry in 2002, or 98%.

At the industry-average CO₂ emission rate of 2,266 tons per employee, a facility would have to count only 11 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class (<50 employees) is considerably lower, at only 249 tons per employee, indicating a threshold size of 101 employees. The average emission rate for the next size category (50–99 employees) is much higher, at 2,612 tons per employee. It would seem reasonable to expect that a facility of 40 employees may fast approach the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in additional emissions regulation. Facilities with fewer than 50 employees emit on average 2,151 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 5 employees would be expected to exceed a 10,000-ton threshold. Therefore, it is possible that some of the 116 facilities in this group, whose average size is only 9 employees, would exceed that level.

5.11.14. Phosphatic fertilizer (NAICS code 325312)

Based on average emissions characteristics across all 44 facilities in this category, only those 18 employing more than 100 people (41%) would be regulated under a 25,000-ton rule. This level of regulation would

represent 1.84 million tons of the total of 1.90 million tons of CO₂ emitted by the industry in 2002, or 97%. It is unlikely that any of the remaining 26 smaller facilities would be regulated.

At the industry-average CO₂ emission rate of 290 tons per employee, a facility would have to count 87 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class (50–99 employees) is considerably lower, at only 35 tons per employee, indicating a threshold size of 714 employees. The average emission rate for the next size category (100–249 employees) is much higher, at 572 tons per employee, implying a much lower threshold level of 44 employees. There is only one facility reported in this size category, which may partially explain how its “average” value lies so far outside the adjacent size categories. The small sampling size in the category of 50–99 employees makes it difficult to draw a firm conclusion about a likely size threshold, but it would seem reasonable to expect it to lie somewhere in the range of 50–100 employees.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in additional emissions regulation. Facilities with fewer than 100 employees emit on average less than 3,000 tons CO₂ per year.

5.11.15. “Pharmaceuticals and medicines” (NAICS codes 32541x)

This group of four sub-categories of the chemical industry includes medicinal and botanical manufacturing, pharmaceutical preparations, in-vitro diagnostic substances, and biological products other than diagnostics. Fuel use in pharmaceutical preparation manufacturing is also reported separately (see below).

Based on average emissions characteristics across all 1,800 facilities in this industry, only those 45 facilities employing more than 1,000 people (2.5%) would be regulated under a 25,000-ton rule. This level of regulation would represent 1.7 million tons of the total of 4.52 million tons of CO₂ emitted by the industry in 2002, or 37%. It is unlikely that many of the remaining facilities would be regulated.

At the industry-average CO₂ emission rate of about 18 tons per employee, a facility would have to count 1,389 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class (1000+ employees) is slightly lower, at 15 tons per employee, indicating a threshold size of 1,667 employees. The average emission rate for facilities with 500–999 employees is 22 tons per employee, indicating a threshold size of 1,136 employees. It would be reasonable to expect any facility of more than 1,100 employees to approach the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in additional emissions regulation. Facilities with 500–999 employees emit on average 14,679 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 454 employees would be expected to exceed a 10,000-ton threshold. The average emission rate for facilities with 250–499 employees is less than 23 tons per employee, indicating a threshold size of 434 employees. Therefore, it is apparent that most facilities of more than 500 employees, and some smaller facilities, would be regulated under a 10,000-ton threshold.

5.11.16. Pharmaceutical preparation (NAICS codes 325412)

Based on average emissions characteristics across all 901 facilities in this industry, only those 31 employing more than 1,000 people (3.4%) would be regulated under a 25,000-ton rule. This level of regulation would represent 1.59 million tons of the total of 3.20 million tons of CO₂ emitted by the industry in 2002, or 50%. It is unlikely that many of the remaining 870 smaller facilities would be regulated.

At the industry-average CO₂ emission rate of about 18 tons per employee, a facility would have to count 1,389 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class (1,000+ employees) is essentially the same, at about 17 tons per employee, indicating a threshold size of 1,470

employees. The average emission rate for facilities with 500–999 employees is slightly higher, indicating a threshold size of 1,142 employees. Therefore, there is no compelling reason to expect a facility of fewer than 1,000 employees to exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in additional emissions regulation. Facilities with 500–999 employees emit on average 14,518 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 454 employees would be expected to exceed a 10,000-ton threshold. Therefore, it is likely that most facilities with more than 500 employees would exceed a 10,000 threshold.

5.11.17. Photographic film, chemicals, etc. (NAICS code 325992)

Comprehensive estimates of CO₂ emissions and emissions per employee and facility in the manufacturing of photographic film, paper, plate and chemicals, were not achieved due to lack of data. Nonetheless, the available data suggest that only those facilities with more than 1,000 employees would exceed the 25,000-ton threshold for CO₂.

The composition of fuel energy use was partially withheld by the EIA. Net electricity and coal use were withheld, but total fuel energy use of 29 trillion Btus was reported, as was natural gas use, at 7 trillion Btus, and residual fuel oil use of about one trillion Btus. Clearly, most of the energy used is split between coal and electricity.

Based on natural gas and residual fuel oil use alone, the three industry facilities with more than 1,000 employees would emit on average in excess of 100,000 tons of CO₂ per year. There are no facilities reported in the size category of 500–999 employees, but the 11 facilities with 250–499 employees would emit less, about 3,600 tons per year on average, and facilities with 100–249 employees emit about 2,200 tons per year on average. Again, the additional emissions from coal use are entirely unknown. If most of the remaining 21 trillion Btus (total, less natural gas and oil) were in the form of coal, which is exceedingly unlikely, many facilities larger than 100 employees would exceed the threshold. Since the unknown distribution between electricity and coal is so large, it is impossible to estimate with any confidence where the size threshold may lie.

5.12. Plastics and rubber (NAICS code 326)

The plastics and rubber products industry covers 17 sub-categories but EIA publishes fuel use data for them only as a single group.

Available information on the amount of coal fuel used in this industry is ambiguous. EIA chose not to report coal usage on account of uncertainty but the implied coal usage, derived from the difference between reported total fuel use and the sum of noncoal fuel use, is 22 trillion Btus. Reported use of other fossil fuels amounts to 140 trillion Btus. The emissions values discussed here are based on noncoal fuel use, but as long as coal use in this industry is not significantly more than the implied value of 22 trillion Btus, the results for relative thresholds would not change.

Based on average emissions characteristics across all 15,487 facilities in this industry, it appears that a 25,000-ton rule for inclusion in the cap would apply to virtually no facilities. At the industry average of 7.8 tons CO₂ emissions per employee, a facility would have to have more than 3,200 employees to cross the 25,000-ton threshold. Therefore it seems likely that few, if any of the facilities in this industry would be affected by the cap under a 25,000-ton rule.

5.13. Nonmetallic minerals (NAICS code 327)

The nonmetallic minerals industry covers 24 sub-categories but EIA publishes fuel use data for five of them individually, and four of them as a group called “glass and glass products.”

There are significant variations in energy use and CO₂ emissions per employee among the sub-categories of this industry group. While average size thresholds are discussed here, it is important to keep in mind that they are not representative of all sub-categories. For example, CO₂ emissions per employee in cement and lime manufacturing are very high compared to other industry categories, and while cement manufacturing represents close to half of fuel-related CO₂ emissions in this industry group, it represents only a fraction of the total number of facilities and employees.

Based on average emission levels across all sub-categories of this industry, only 1,104 of 16,653 facilities (6.6%) would be regulated under a 25,000-ton rule. These are facilities that employ more than 100 people and some smaller facilities such as cement manufacturers with more than 50 employees and all lime manufacturing plants. This level of regulation would represent 58.6 million tons of the total of 63.9 million tons of CO₂ emitted by the industry in 2002, or 92%.

At the industry-average CO₂ emission rate of 132 tons per employee, a facility would have to count about 190 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class (100–249 employees) is higher, indicating a threshold size of 281 employees. Therefore, it is reasonable to anticipate that any facility employing more than 190 people, and some smaller facilities, may exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in additional coverage because some smaller flat glass manufacturers (50–99 employees) and the smallest cement manufacturing plants would exceed that threshold.

5.13.01. “Glass and glass products” (NAICS codes 32721x)

This group of four sub-categories covers flat glass manufacturing, glass containers, pressed and blown glass and glassware, and glass product made of purchased glass. Fuel use for the first two categories is reported separately (see below).

Based on average emissions characteristics across all 2,261 facilities in this industry, only those 148 facilities employing more than 250 people and flat glass manufacturers employing more than 100 people (6.5%) would be regulated under a 25,000-ton rule. This level of regulation would represent 5.99 million tons of the total of 8.13 million tons of CO₂ emitted by the industry in 2002, or 74%. It is unlikely that many of the remaining facilities would be regulated.

At the industry-average CO₂ emission rate of about 70 tons per employee, a facility would have to count 358 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class (250–499 employees) is higher, at 103 tons per employee, indicating a threshold size of 243 employees. It would be reasonable to expect any facility of 250 employees to approach the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in emissions regulation from an additional 158 facilities. Facilities with 100–249 employees emit on average 89 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 113 employees would be expected to exceed a 10,000-ton threshold. The average emission rate for facilities with 50–99 employees indicates a threshold size of 454 employees. Therefore, it is apparent that most facilities of more than 100 employees would be regulated under the 10,000-ton threshold but most smaller facilities would not be regulated.

5.13.02. Flat glass (NAICS code 327211)

Based on average emissions characteristics across all 36 facilities in this industry, those 31 employing more than 100 people (86%) would be regulated under a 25,000-ton rule. This level of regulation would represent 2.74 million tons of the total of 2.76 million tons of CO₂ emitted by the industry in 2002, or 99.4%. It is unlikely that many of the remaining smaller facilities would be regulated.

At the industry-average CO₂ emission rate of about 258 tons per employee, a facility would have to count 97 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class (100–249) is slightly lower, at 249 tons per employee, indicating a threshold size of 101 employees. Therefore, it would be reasonable to expect that only when a facility exceeds 100 employees is it likely to exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in additional emissions regulation. Facilities with 50–99 employees emit on average 10,163 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 52 employees would be expected to exceed a 10,000-ton threshold. Therefore, it is apparent that most facilities of more than 50 employees would be regulated under a 10,000-ton threshold, while most smaller facilities would not be regulated.

5.13.03. Glass containers (NAICS code 327213)

Comprehensive estimates of CO₂ emissions and emissions per employee and facility in the glass container manufacturing industry were not achieved due to lack of data. Nonetheless, the available data suggest that only those facilities with more than 100 employees would exceed the 25,000-ton threshold for CO₂.

EIA did not report data on energy use for the nine facilities (from a total of 65) that have fewer than 100 employees.

Based on the reported industry-wide average energy use per employee, and the derived average CO₂ emission rate of 175 tons per employee, the single establishment with 50–99 employees (reported to have 91 employees) would emit close to 16,000 tons of CO₂ per year. The eight facilities with fewer than 50 employees (with seven employees each on average) would emit a bit over 1,200 tons per year on average. On the other hand, facilities with 100–249 employees would emit more than 37,000 tons per year, based on an emission rate of 197 tons per employee. Due to the small number and size of facilities with fewer than 100 employees, it appears that virtually all CO₂ emissions from this industry would be covered under a 25,000-ton threshold.

5.13.04. Cement manufacturing (NAICS code 327310)

Based on average emissions characteristics across all 246 facilities in this industry, the 120 facilities with more than 50 employees (49%) would be expected to be affected by a 25,000-ton rule. The affected facilities emit more than 28 million tons, or 92% of total emissions from cement manufacturing. As in every other category, this amount is based on fuel-related emissions only. There are significant additional process emissions of CO₂ in cement manufacturing.

At the average emission rate for facilities with 50–99 employees (1,769 tons per employee), a facility would have to count only 14 employees to cross the 25,000-ton threshold. At the average emission rate for facilities with fewer than 50 employees (1,630 tons per employee), a facility would need only 15 employees to cross the 25,000-ton threshold. Therefore it seems possible that facilities with fewer than 50 employees would also be affected by the cap with a 25,000-ton rule.

5.13.05. Lime manufacturing (NAICS code 327410)

Based on average emissions characteristics across all 77 facilities in this industry, every one of them would be regulated under a 25,000-ton rule, for a total of 9.5 million tons. Again, this amount is based on fuel-related emissions only. There are significant additional process emissions of CO₂ in lime manufacturing.

At the average emission rate for facilities of fewer than 50 employees (4,124 tons per employee), a facility would have to count three employees to cross the 10,000-ton threshold. On average, facilities in this category had 18 employees in 2002 and emissions exceeded 74,000 tons.

5.13.06. Mineral wool (NAICS code 327993)

Based on average emissions characteristics across all 304 facilities in this industry, those 53 facilities employing more than 100 people (17%) would be regulated under a 25,000-ton rule. This level of regulation would represent 1.91 million tons of the total of 2.14 million tons of CO₂ emitted by the industry in 2002, or 89%. It is unlikely that many of the remaining smaller facilities would be regulated.

At the industry-average CO₂ emission rate of about 111 tons per employee, a facility would have to count 225 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class is lower, at 93 tons per employee, indicating a threshold size of 269 employees. The average emission rate for facilities with 100–249 employees is significantly higher again, at 174 tons per employee, indicating a threshold size of 145 employees. Therefore, it would be reasonable to expect that only when a facility approaches 150 employees is it likely to exceed the 10,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in much additional emissions regulation, except that all facilities above 100 employees would almost certainly be covered by this lower threshold. Facilities with 50–99 employees emit on average 6,468 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 107 employees would be expected to exceed a 10,000-ton threshold. The average emission rate for facilities with fewer than 50 employees is significantly lower, indicating a threshold size of 477 employees. Therefore, it is apparent that not many facilities with fewer than 100 employees would be regulated under a 10,000-ton threshold.

5.14. Primary metals (NAICS code 331)

The primary metals industry covers 26 sub-categories. EIA publishes fuel use data for six of them individually, as well as several groups of related sub-categories.

There are significant variations in energy use and CO₂ emissions per employee among the sub-categories of this industry group. As noted for other industries, the industry-wide emission characteristics and thresholds are not representative of all sub-categories. Aluminum production is a particular case as it involves significant process emissions of CO₂. These nonfuel emissions are not quantified here.

Based on average emission levels across all sub-categories of this industry, only the 462 facilities employing more than 250 people, plus another ten ferroalloy manufacturers employing 50–240 people, would be regulated under a 25,000-ton rule, out of a total of 5,188 facilities. This level of regulation would represent 106 million tons of the total of 119 million tons of CO₂ emitted by the industry in 2002, or 89%.

At the industry-average CO₂ emission rate of 243 tons per employee, a facility would have to count about 102 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class (100–249 employees) is lower, indicating a threshold size of 365 employees. Therefore it seems likely that most facilities with fewer than 250 employees would not be affected by a 25,000-ton rule.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in additional emissions regulation. The average facility with 100–249 employees emitted 10,779 tons CO₂. At the average emission rate for this size class, a facility would need to have 146 employees to cross a 10,000-ton threshold. This suggests that many of the 718 facilities in the 100–249 employee size class would be affected by a 10,000-ton rule.

5.14.01. Iron and steel mills (NAICS code 331111)

Based on average emissions characteristics across all 373 facilities in this industry, those 106 facilities employing more than 250 people (28%) would be regulated under a 25,000-ton rule. This level of regulation would represent 89 million tons of the total of 91 million tons of CO₂ emitted by the industry in 2002, or 98%. It is unlikely that many of the remaining smaller facilities would be regulated.

At the industry-average CO₂ emission rate of about 766 tons per employee, a facility would have to count 33 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class is lower, at 338 tons per employee, indicating a threshold size of 74 employees. There is a significant dip in reported energy use per employee for facilities with 50–99 employees (84 tons) and 100–249 employees (97 tons) relative to both smaller and larger facilities. In general, it would be reasonable to expect that only when a facility approaches 250 employees is it likely to exceed the 25,000-ton threshold. However, the somewhat bifurcated emissions profile of this industry means that some of the 267 facilities with fewer than 250 employees may exceed the 25,000-ton threshold, although that is fairly unlikely.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in additional emissions regulation. Facilities with 100–249 employees emit on average 15,277 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 104 employees would be expected to exceed a 10,000-ton threshold. Therefore, it is apparent that most of the 51 facilities of 100–249 employees would be regulated under the 10,000-ton threshold.

5.14.02. Electrometallurgical ferroalloys (NAICS code 331112)

Based on average emissions characteristics across all 24 facilities in this industry, those 12 employing more than 50 people (50%) would be regulated under a 25,000-ton rule. This level of regulation would represent 711,000 tons of the total of 800,000 tons of CO₂ emitted by the industry in 2002, or 89%. It is unlikely that many of the remaining smaller facilities would be regulated.

At the industry-average CO₂ emission rate of about 326 tons per employee, a facility would have to count 77 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class (50–99 employees) is higher, at 541 tons per employee, indicating a threshold size of 46 employees. Therefore, it would be reasonable to expect that a facility approaching 50 employees would be likely to exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in much additional emissions regulation. The 12 facilities with fewer than 50 employees emit on average 7,391 tons CO₂ per year and have 20 employees on average. At the average emission rate per employee for that size category, a facility of 27 employees would be expected to exceed a 10,000-ton threshold.

5.14.03. “Steel products from purchased steel” (NAICS codes 3312xx)

This group of three sub-categories covers iron and steel pipe and tube manufacturing from purchased steel, rolled steel shape manufacturing, and steel wire drawing.

The following discussion is based on CO₂ emissions from fuel energy use in this industry. EIA withheld the amount of nonfuel (feedstock) use of coke, due to uncertainty. Assuming the nonfuel use of coke is

not insignificant and that some portion of it is not sequestered in industry products, total emissions in the industry would be higher than indicated here. This would be a reasonable assumption.

Based on average emissions characteristics from reported fuel use alone, none of the 666 facilities in this industry would be affected by a 25,000-ton rule. At the average emissions rate of 24 tons CO₂ per employee, a facility would need over 1,000 employees to exceed the 25,000-ton threshold, but there were no facilities in the 1000+ employee size class. However, the lack of complete data casts some uncertainty on this conclusion.

5.14.04. “Alumina and aluminum” (NAICS codes 33131x)

This group of six sub-categories covers: alumina refining; primary aluminum production; secondary smelting and alloying of aluminum; aluminum sheet, plate, and foil manufacturing; aluminum extruded product manufacturing; and other aluminum rolling and drawing.

There are significant process emissions of CO₂ in primary aluminum production. These emissions are not included here.

Based on average emissions characteristics across all 592 facilities in this industry, only those 78 employing more than 250 people (13%) would be regulated under a 25,000-ton rule. This level of regulation would represent 10.1 million tons of the total of 11.3 million tons of CO₂ emitted by the industry in 2002, or 89%.

At the industry-average CO₂ emission rate of about 158 tons per employee, a facility would have to count 158 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class is essentially the same, at 162 tons per employee, indicating a threshold size of 154 employees, so it would be reasonable to expect many facilities with more than 150 employees to be affected by a 25,000-ton rule.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in many additional affected facilities. Facilities with 100–249 employees emit on average 7,206 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 220 employees would be expected to exceed a 10,000-ton threshold. Therefore, it is apparent that few facilities with less than 250 employees would be affected by a 10,000-ton threshold.

5.14.05. Primary aluminum (NAICS code 331312)

Comprehensive estimates of fuel-related CO₂ emissions and emissions per employee and facility in primary aluminum manufacturing were not achieved due to lack of data. Nonetheless, the available data suggest that, based on fuel energy use alone, primary aluminum facilities with more than 250 employees would exceed the 25,000-ton threshold for CO₂.

EIA did not report data on energy use for the 20 facilities (from a total of 41) that have fewer than 100 employees. Most of the energy used in this industry (and the source of significant CO₂ emissions) is in the form of electricity (to break the oxygen bond of aluminum oxide) and nonfuel coke (carbon bonds with oxygen to form CO₂). These significant emissions are not counted here.

Based on the reported average energy use per employee at facilities of 250–499 employees and the derived average fuel-related CO₂ emission rate of 109 tons per employee, a facility of 230 employees would exceed the 25,000-ton threshold.

5.14.06. “Nonferrous metals except aluminum” (NAICS codes 3314xx)

This group of seven sub-categories covers smelting, refining, alloying and forming of nonferrous metals in general and copper in particular.

Based on average emissions characteristics across all 1,021 facilities in this industry, only those 64 employing more than 250 people (6.3%) would be regulated under a 25,000-ton rule. This level of regulation would represent 2.5 million tons of the total of 4.3 million tons of CO₂ emitted by the industry in 2002, or 59%.

At the industry-average CO₂ emission rate of about 65 tons per employee, a facility would have to count 386 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class is higher, at 77 tons per employee, indicating a threshold size of 324 employees. It would be reasonable to expect any facility approaching 300 employees to approach the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in much additional emissions regulation. The 120 facilities with 100–249 employees emit on average 7,956 tons CO₂ per year. At the average emission rate per employee for that size category, a facility of 192 employees would be expected to exceed a 10,000-ton threshold. The average emission rate for the 119 facilities with 50–99 employees indicates a threshold size of 157 employees. Therefore, it is apparent that most facilities of more than 200 employees would be affected by a 10,000-ton threshold and that some smaller facilities might also be affected.

5.14.07. “Foundries” (NAICS codes 3315xx)

This group of eight sub-categories covers iron, steel, aluminum, copper, and other nonferrous foundries.

Based on industry-wide average emissions characteristics across all 2,512 foundries, only those 56 facilities employing more than 500 people, and another 47 iron foundries of more 250–499 employees, (4.1% of all foundries) would be regulated under a 25,000-ton rule. This level of regulation would represent 3.9 million tons of the total of 7.6 million tons of CO₂ emitted by the industry in 2002, or 51%.

At the industry-average CO₂ emission rate of about 42 tons per employee, a facility would have to count 596 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class is higher, at 54 tons per employee, indicating a threshold size of 463 employees, so it would be reasonable to conclude that, on average, any facility approaching 500 employees might exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in additional emissions regulation. The 111 foundries with 250–499 employees emit on average 18,543 tons CO₂ per year. At the average emission rate per employee for that size category, a facility with 185 employees would be expected to exceed a 10,000-ton threshold. The average emission rate for the 302 facilities with 100–249 employees indicates a threshold size of 285 employees. Therefore, it is reasonable to conclude that most facilities with more than 250 employees would be included in the cap under a 10,000-ton threshold, while many smaller facilities, with the exception of iron foundries, would not be affected.

5.14.08. Iron foundries (NAICS codes 331511)

Based on industry-wide average emissions characteristics across all 619 iron foundries, only those 69 employing more than 250 people (11%) would be regulated under a 25,000-ton rule. This level of regulation would represent 3.3 million tons of the total of 4.9 million tons of CO₂ emitted by the industry in 2002, or 68%. It is very likely that several smaller iron foundries would also be regulated.

At the industry-average CO₂ emission rate of about 74 tons per employee, an iron foundry would have to count 340 employees to cross the 25,000-ton threshold. However, the average emission rate for the corresponding size class is higher, at about 85 tons per employee, indicating a threshold size of 294 employees. Average annual emissions for the 87 iron foundries with 100–249 employees remain well under the threshold at 9,387 tons and their average emissions indicating a threshold of 427 employees. Average emission rates for the 88 iron foundries with 50–99 employees are higher again, indicating a threshold of 248 employees.

Therefore, it would be reasonable to conclude that any iron foundry approaching 250 employees might exceed the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in some additional emissions regulation. Foundries with 100–249 employees emit on average 9,387 tons per year. At the average emission rate per employee for that size category, a facility of 171 employees would be expected to exceed a 10,000-ton threshold. The average emission rate for the 88 facilities with 50–99 employees indicates a threshold size of 100 employees. Therefore, it seems likely that only some of the facilities with 100–249 employees would be affected by a 10,000-ton threshold.

5.14.09. Aluminum die-casting foundries (NAICS codes 331521)

Based on industry-wide average emissions characteristics across all 295 aluminum die-casting foundries, only 2 facilities employing more than 1,000 people (0.7%) would be affected by a 25,000-ton threshold. This level of regulation would represent 215,000 tons of the total of 849,000 tons of CO₂ emitted by the industry in 2002, or 25%. It is not likely that smaller foundries would be regulated.

At the industry-average CO₂ emission rate of about 30 tons per employee, an aluminum die-casting foundry would have to count 833 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class is slightly lower, at about 28 tons per employee, indicating a threshold size of 908 employees. The average annual emissions for aluminum die-casting foundries with more than 1,000 employees are above the threshold, at 107,254 tons per year. Since the average emission rate for foundries with 250–499 employees is slightly higher, indicating a threshold of 777 employees, it would be reasonable to conclude that any foundry exceeding 900 employees might approach the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in significant additional emissions regulation. The 5 foundries with 500–999 employees emit on average 18,091 tons per year, and the 16 foundries with 250–499 employees emit on average 11,207 tons per year. Therefore, it appears that most foundries with more than 250 employees would be affected by a 10,000-ton threshold.

5.14.10. Aluminum foundries (except die-casting) (NAICS codes 331524)

Based on industry-wide average emissions characteristics across all 542 such facilities, only the single facility employing more than 1,000 people (0.2%) would be affected by a 25,000-ton threshold. This level of regulation would represent 56,000 tons of the total of 743,000 tons of CO₂ emitted by the industry in 2002, or 8%. It is possible that some smaller foundries would also be affected.

At the industry-average CO₂ emission rate of about 26 tons per employee, a foundry would have to count 961 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class is higher, at about 36 tons per employee, indicating a threshold size of 694 employees. The average annual emissions for the ten foundries with 500–999 employees are not far below the threshold, at 22,580 tons per year. It would be reasonable to conclude that at least some of the ten foundries in this size class, which together represent another 226,000 tons of CO₂, would approach the 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in additional emissions regulation. The average annual emissions of the ten foundries with 500–999 employees is 22,580 tons, so most if not all of them would be expected to exceed a 10,000-ton threshold. The average annual emissions for the next smaller size class is much lower, at 8,931 tons, indicating that many facilities in this size class would be unaffected by a 10,000-ton threshold.

5.15. Fabricated metals (NAICS code 332)

Fabricated metals cover 43 sub-categories of industry. EIA reported energy use for this industry as a single group, but not individually for any of the sub-categories.

Based on industry-wide average emissions characteristics, none of the 62,176 facilities are expected to be affected by a 25,000-ton threshold. At the industry-average CO₂ emission rate of 7.5 tons per employee, a metals fabrication facility would have to count 3,334 employees to cross the 25,000-ton threshold. There are 33 facilities with more than 1,000 employees, but, because their average emissions are 13,660, it is somewhat unlikely that any are large enough to be affected by a 25,000-ton threshold. Nonetheless, there are 43 sub-categories to this sector and some particular metal fabricators may stand out from the average energy use.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would affect at least some facilities. The average annual emissions at facilities with more than 1,000 employees are above a 10,000-ton threshold. At the average emission rate for facilities in this size class, a facility would need 1,140 employees to exceed a 10,000-ton threshold. Therefore, it seems likely that at least some of the 33 facilities with more than 1,000 employees would be affected by a 10,000-ton rule.

5.16. Machinery (NAICS code 333)

Manufacturing of machinery covers 49 sub-categories of industry. EIA reported energy use for this industry as a single group but not individually for any of the sub-categories.

Based on industry-wide average emissions characteristics, none of the 28,239 facilities would be expected to be affected by a 25,000-ton threshold. The average emissions from facilities in the largest size class are only 10,182 tons per year, and at the average emissions rate for that size class, a facility would have to have more than 4,000 employees while the average number of employees in that size class is only 1,644. Therefore it seems likely that few, if any, facilities would be affected.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would result in at least some affected facilities. The average annual emissions at the 87 facilities with more than 1,000 employees are more than a 10,000-ton threshold, and at the average emissions rate for that size class, a facility would need 1,615 employees to be affected. Therefore, it is likely that some of the largest facilities in this industry would be affected by a 10,000-ton threshold because the average number of employees in that size class is 1,644.

5.17. Computers and electronics (NAICS code 334)

Computers and electronics cover 30 sub-categories of industry. EIA reported energy use individually for the semiconductor industry as well as for the larger industry as a whole.

Based on industry-wide average emissions characteristics across all 15,813 such facilities, not a single facility would be regulated under a 25,000-ton rule.

At the industry-average CO₂ emission rate of 2.85 tons per employee, a facility would have to count 8,772 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class is 2.93 tons per employee (annual average of 6,739 tons per facility), indicating a threshold size of 8,533 employees. It would be reasonable to conclude that any facility with more than 8,500 employees might exceed the 25,000-ton threshold but the average size of the 191 largest facilities is much lower, at 2,296 employees.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not affect many facilities. The average annual emissions at the 191 facilities with more than 1,000 employees indicate a threshold size of 3,413 employees. However, as the average emissions for

facility in this size class are 6,739 tons, it seems likely that most facilities would be unaffected by a 10,000-ton rule.

5.18. Electrical equipment, appliances, and components (NAICS code 335)

Manufacturing of electrical equipment, appliances, and components covers 22 sub-categories of industry. EIA reported energy use for this industry as a single group but not individually for any of the sub-categories.

Based on average emissions characteristics across all 6,481 such facilities, few, if any, would be affected by a 25,000-ton threshold. The average emissions for the 51 facilities with more than 1,000 employees were 9,483 tons in 2002, and at the average emissions rate for facilities in that size class, a facility would need 4,690 employees to exceed the threshold. However, these 51 facilities had an average of 1,780 employees in 2002, which indicates that most, if not all, would fall well under the threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in significant numbers of affected facilities. The average annual emissions of facilities with more than 1,000 employees were 9,483 tons in 2002, and the average emissions rate for those facilities indicates that a facility would need 1,876 employees to be affected by a 10,000-ton threshold. Therefore, it is likely that some of the 51 largest facilities would be affected, but all smaller facilities would probably not exceed a 10,000-ton threshold.

5.19. Transportation equipment (NAICS code 336)

Manufacturing of transportation equipment covers 30 sub-categories of industry. EIA reported energy use individually for the sub-category of light truck and utility vehicle manufacturing as well as for the industry as a whole.

Based on industry-wide average emissions characteristics across all 12,579 such facilities, only a handful would be affected by a 25,000-ton threshold. The average emissions for facilities with more than 1,000 employees are close to the threshold, at 24,379 tons. At the average emissions rate for this size class, a facility would need 3,101 employees to cross the 25,000-ton threshold. It is unclear how many of the 272 facilities with more than 1,000 employees would exceed this threshold.

Based on the average emission levels of facilities within each size category, there would be at least some additional facilities affected by a lower threshold of 10,000 tons CO₂ per year. At the average CO₂ emission rate of the largest size class is higher, about 8.1 tons per employee, a facility would need 1,241 employees to be affected by the 10,000-ton threshold. The average annual emissions of these large facilities were in excess of 24,000 tons in 2002, but the average annual emissions for facilities with 500–999 employees would be significantly below the threshold, at 6,918 tons per year. It would be reasonable to conclude that any facility exceeding 1,200 employees might approach a 10,000-ton threshold.

5.19.01. Light trucks and utility vehicles (NAICS code 336112)

Comprehensive estimates of CO₂ emissions and emissions per employee and facility in light truck and utility vehicle manufacturing were not achieved due to lack of data.

The industry's 97 facilities are either very small (61 facilities with fewer than 50 employees), or very large (35 facilities with more than 1,000 employees). EIA partially withheld the composition of energy use in this industry, not revealing either net-electricity or coal use. Subsequently, it is impossible to estimate non-electricity CO₂ emissions.

Nonetheless, based on the reported industry-wide average energy use per employee, it seems safe to assume that most of the 35 facilities of more than 1,000 employees would exceed the 25,000-ton threshold, while the 61 small facilities would almost certainly not exceed the threshold.

5.20. Furniture and related products (NAICS code 337)

Manufacturing of furniture and related products covers 13 sub-categories of industry. EIA reported energy use for this industry as a single group but not individually for any of the sub-categories.

Based on industry-wide average emissions characteristics across all 22,524 such facilities, not a single one would be regulated under a 25,000-ton rule.

At the industry-average CO₂ emission rate of 2.6 tons per employee, a facility would have to count 9,616 employees to cross the 25,000-ton threshold. The average emission rate for the corresponding size class is higher, at 5.0 tons per employee, indicating a threshold size of 5,000 employees. The average annual emissions of these large facilities were 8,562 tons in 2002. Therefore it seems likely that few, if any, of these facilities would be affected by a 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would also not affect many facilities. While the average emissions for this size class are below a 10,000-ton threshold, the average annual emissions at the 41 facilities with more than 1,000 employees indicate that a facility would have to have 2,012 employees to be affected. This suggests that it is possible that at least some of the facilities in this category would cross the 10,000-ton threshold.

5.21. Miscellaneous (NAICS code 339)

This category covers 24 sub-categories of industry. EIA reported energy use for this industry as a single group but not individually for any of the sub-categories.

Based on industry-wide average emissions characteristics across all 32,598 such facilities, not a single one would be expected to be regulated under a 25,000-ton rule.

At the industry-average CO₂ emission rate of 2.3 tons per employee, a facility would have to count 10,869 employees to cross the 25,000-ton threshold. The average annual emissions of facilities with more than 1,000 employees were 4,324 tons in 2002. It would be reasonable to conclude that few, if any, facilities would exceed a 25,000-ton threshold.

Based on the average emission levels of facilities within each size category, a lower threshold of 10,000 tons CO₂ per year would not result in additional emissions regulation. The average annual emissions at the 48 facilities with more than 1,000 employees (average of 1,617 employees) indicate a threshold of 3,746 employees, suggesting that most of the facilities in this category would not cross the 10,000-ton threshold.

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