

CHAPTER 12. PRELIMINARY MANUFACTURER IMPACT ANALYSIS

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CHAPTER 12 PRELIMINARY MANUFACTURER IMPACT ANALYSIS

12.1 INTRODUCTION

The purpose of the manufacturer impact analysis (MIA) is to identify and quantify the likely impacts of energy conservation standards on manufacturers. In the Notice of Proposed Rulemaking (NOPR) stage of the analysis, DOE considers a wide range of quantitative and qualitative industry impacts that might occur due to an energy conservation standard. For example, a particular standard level could require changes in manufacturing practices, equipment, raw materials, etc. DOE fully analyzes these impacts during the NOPR stage.

DOE announced changes to the preliminary analysis MIA format through a report issued to Congress on January 31, 2006 (as required by section 141 of the Energy Policy Act of 2005 (EPACT 2005), entitled “Energy Conservation Standards Activities.”¹ As a result, DOE collects, evaluates, and reports preliminary MIA information in the preliminary analysis (as opposed to waiting for the NOPR stage). Such preliminary information includes market data, market shares, industry consolidation, product mix, key issues, conversion costs, foreign competition, and cumulative regulatory burden information, if available. DOE solicits this information during the preliminary manufacturer interviews and reports the results in this chapter.

To the extent appropriate for this rulemaking, DOE applies the methodology described below to evaluate energy conservation standards for walk in coolers and freezers.

12.2 METHODOLOGY

DOE conducts the MIA in three phases. In Phase I, DOE creates an industry profile to characterize the industry and conducts a preliminary MIA to identify important issues that require consideration. Section 12.3.1 of this chapter presents initial findings of the Phase I analysis. In Phase II, DOE prepares an industry cash flow model and a detailed interview questionnaire to guide subsequent discussions with manufacturers. In Phase III, DOE interviews manufacturers and assesses the impacts of energy conservation standards both quantitatively and qualitatively. DOE assesses industry and subgroup cash flow impacts and industry net present value (INPV) using the Government Regulatory Impact Model (GRIM). For additional details on the GRIM, see section 12.2.2.1. DOE also assesses impacts on competition, manufacturing capacity, employment, and regulatory burden based on manufacturer interviews and discussions. The NOPR and technical support document (TSD) present results of the Phase II and III analyses.

¹ This report is available on the DOE website at www.eere.energy.gov/buildings/appliance_standards/2006_schedule_setting.html.

12.2.1 Phase I: Industry Profile

In Phase I of the MIA, DOE collects pertinent qualitative and quantitative financial and market information. This includes data on wages, employment, industry costs, and capacity utilization rates for manufacturers of walk in coolers and freezers. Sources of information include reports published by industry groups, trade journals, the U.S. Census Bureau, and Securities Exchange Commission (SEC) 10-K filings. In addition, DOE relies on information from its market and technology assessment, engineering analysis, life-cycle cost analysis, and consumer price analysis to characterize the walk in cooler and freezer manufacturing industry.

12.2.2 Phase II: Industry Cash-Flow Analysis and Interview Guide

In Phase II, DOE performs a preliminary industry cash-flow analysis and prepares written guidelines for interviewing manufacturers.

12.2.2.1 Industry Cash-Flow Analysis

The GRIM is a financial model that analyzes the impacts of energy conservation standards. Energy conservation standards may affect investment, production costs, and revenue through changes in prices and, possibly, shipments. The GRIM uses several factors to determine a series of annual cash flows for the year that energy conservation standards become effective and for several years after implementation. These factors include annual expected revenues, costs of sales, selling and general administration costs, taxes, and capital expenditures. Inputs to the GRIM include financial information, manufacturing costs, shipment forecasts, and price forecasts developed in other analyses. The financial information is developed from publicly available data and confidentially submitted manufacturer information. DOE compares the results of the GRIM against baseline projections in which no energy conservation standards are in place. The financial impact of energy conservation standards is the difference between the two sets of discounted annual cash flows.

12.2.2.2 Interview Guide

DOE conducts interviews with manufacturers to gather information on the effects of energy conservation standards on revenues, costs, direct employment, capital assets, and industry competitiveness. Before the interviews, which occur in Phase III, DOE distributes an interview guide to help identify the impacts of energy conservation standards on individual manufacturers or subgroups of manufacturers. Interview guide topics include: production costs; shipment projections; market share; product mix; conversion costs; markups and profitability; competition; manufacturing capacity; cumulative regulatory burden; and other relevant topics.

12.2.3 Phase III: Subgroup Analysis

Phase III activities take place after publication of the preliminary analysis. These activities include manufacturer interviews; revision of the industry cash-flow analysis; a manufacturer subgroup analysis; an assessment of the impacts on industry competition, manufacturing capacity, direct employment, cumulative regulatory burden, as well as other qualitative impacts.

12.2.3.1 Manufacturer Interviews

DOE conducts detailed interviews with manufacturers to gain insight into the potential impacts of energy conservation standards on sales, direct employment, capital assets, and industry competitiveness. The interview process is critical to the MIA because it provides an opportunity for manufacturers to privately express their views on important issues. Interviews are scheduled well in advance to provide every opportunity for manufacturers to be available for comment. Although a written response to the questionnaire is acceptable, DOE prefers interactive interviews, which help clarify responses and provide the opportunity to identify additional issues not specifically addressed in the interview questionnaire. A non-disclosure agreement allows confidential or sensitive information to be considered in DOE's decision-making process. Confidential information will not be made available in the public record. At most, sensitive or confidential information may be aggregated and presented in industry-wide representations.

DOE supplements the information gathered in Phase I and the cash flow analysis performed in Phase II with information gathered during manufacturer interviews.

12.2.3.2 Revised Industry Cash-Flow Analysis

As discussed, DOE requests information about profitability impacts, necessary plant changes, and other manufacturing impacts during the interview process. DOE revises its industry cash flow model based on the feedback it receives in comments and during interviews.

12.2.3.3 Manufacturer Subgroup Analysis

Using average cost assumptions to develop an industry cash flow estimate will not adequately assess differential impacts among manufacturer subgroups. Smaller manufacturers, niche players, and manufacturers exhibiting a cost structure that differs largely from the industry average could be more negatively affected. Ideally, DOE would consider the impact on every firm individually; however, it typically uses the results of the industry characterization to group manufacturers with similar characteristics. During the interviews, DOE discusses the potential subgroups that have been identified for the analysis. DOE asks manufacturers and other interested parties to suggest what subgroups or characteristics are most appropriate for the analysis.

12.2.3.4 Competitive Impact Assessment

Section 342 (6)(B)(i)(V) of the Energy Policy Act of 1992 (EPCA) directs DOE to consider any lessening of competition likely to result from the imposition of standards. EPCA further directs the U.S. Attorney General to determine the impacts, if any, of any decrease in competition. DOE attempts to gather and report firm-specific financial information and impacts wherever possible. DOE bases the competitive impact assessment on manufacturer cost data and other information collected from interviews. When assessing competitive impacts, DOE's interviews generally focus on assessing asymmetrical cost increases, the potential increase in business risks from an increased proportion of fixed costs, and potential barriers to market entry (*e.g.*, proprietary technologies). The competitive analysis will also focus on assessing any differential impacts to smaller manufacturers.

12.2.3.5 Manufacturing Capacity Impact

One of the significant outcomes of energy conservation standards can be the obsolescence of existing manufacturing assets, including tooling and other investments. The manufacturer interview guide presents a series of questions to help identify impacts on manufacturing capacity, specifically capacity utilization and plant location decisions in the United States with and without energy conservation standards. The interview guide also addresses the ability of manufacturers to upgrade or remodel existing facilities to accommodate the new requirements; the nature and value of stranded assets, if any; and estimates for any one-time restructuring or other charges, where applicable.

12.2.3.6 Employment Impact

The impact of energy conservation standards on employment is an important consideration in the rulemaking process. To assess how domestic employment patterns might be affected, the interview process explores current employment trends in the walk in coolers and freezers industry and solicits manufacturer views on changes in employment patterns that may result from increased standard levels. The employment impacts section of the interview guide focuses on current employment levels at production facilities; expected future employment levels with and without an energy conservation standard; differences in workforce skills; and employee retraining.

12.2.3.7 Cumulative Regulatory Burden

DOE seeks to mitigate the overlapping effects on manufacturers due to energy conservation standards and other regulatory actions. DOE analyzes and considers the impact on manufacturers of multiple, product-specific regulatory actions.

12.3 PRELIMINARY MANUFACTURER IMPACT ANALYSIS RESULTS

During the preliminary activities phase, DOE conducted a preliminary evaluation of the impact of potential energy conservation standards on the walk-in cooler and freezer industry.

The primary sources of information for this analysis the U.S. Census, industry reports, and interviews with manufacturers of walk-in equipment, conducted during the summer of 2009. To maintain confidentiality, DOE only reports aggregated information here. DOE does not disclose company-specific information, nor does it identify the individual manufacturers that disclosed information.

12.3.1 Industry Overview

The following section summarizes publicly available industry data.

12.3.1.1 Industry Cost Structure

DOE is unaware of any publicly available industry-wide cost data specific to only manufacturers of walk in coolers and walk in freezers. DOE examined the North American Industry Classification System (NAICS) codes for small business sizes and determined that walk-in cooler and freezer manufacturing is classified as a subset under NAICS code 333415 (*Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing*). Therefore, DOE presents the data below as a broader industry proxy for the walk in cooler and freezer industry, which, in combination with information gained in interviews, inform DOE’s analysis of the industry cost structure. DOE recognizes that not all manufacturers of walk-in cooler and freezer equipment may classify themselves under NAICS code 333415, particularly those that only manufacture WICF envelopes. However, DOE was unable to find another NAICS code that corresponded closely to envelope manufacturing. DOE will conduct additional research to determine if a more appropriate code can be used. If DOE determines that a different NAICS industry code should be used to represent WICF envelope manufacturers, DOE will report the following data for that industry separately.

DOE obtained the below data from U.S. Census Bureau, *Annual Survey of Manufacturers, Statistics for Industry Groups and Industries* from 2002-2007.

Table 12.3.1 presents the walk-in cooler and freezer employment levels and earnings from 2002 to 2007. The statistics illustrate approximately an 8-percent decrease in production workers and overall number of employees from 2002 to 2007.

Table 12.3.1 Employment and Earnings for the Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing Industry

Year	Production Workers	All Employees	Annual Payroll (\$000s)
2002	80,400	108,252	3,815,129
2003	77,471	104,646	3,775,799
2004	73,559	99,669	3,707,969
2005	76,011	102,354	3,942,808
2006	74,909	98,097	4,019,813
2007	73,993	100,284	3,975,785

Source: U.S. Census Bureau. *Annual Survey of Manufacturers, 2002-2007*

Table 12.3.2 presents the costs of materials and industry payroll as a percentage of shipment value from 2002 to 2007. The cost of materials as a percentage of shipment value has steadily increased from 2002 to 2007. The cost of payroll for production workers and the cost of total payroll have declined by 17.3 percent and 16.1 percent, respectively.

Table 12.3.2 Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing Industry Material and Payroll Costs

Year	Cost of Materials (percent of shipment value)	Cost of Payroll for Production Workers (percent of shipment value)	Cost of Total Payroll (percent of shipment value)
2002	49.36	9.83	15.85
2003	50.59	9.53	15.39
2004	51.81	8.99	14.57
2005	53.78	8.52	13.78
2006	53.17	8.87	13.80
2007	55.52	8.12	13.29

Source: U.S. Census Bureau. *Annual Survey of Manufacturers, 2002-2007*

12.3.1.2 Inventory Levels

Table 12.3.3 shows the year-end inventory for the Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing industry obtained from the U.S. Census Bureau, *Annual Survey of Manufacturers, Statistics for Industry Groups and Industries* from 2002 to 2007. Year-end inventory refers to the amount of inventory a manufacturer has on hand at year end, which includes work-in-progress and finished goods. Again, DOE presents these data as a broader measure of the walk in coolers and freezers industry. The industry's end-of-year inventory from 2002 to 2007 increased when expressed both in dollars and as a percentage of shipment value.

Table 12.3.3 End-of-Year Inventory for the Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing Industry

Year	End-of-Year Inventory (\$000s)	End-of-Year Inventory (percent of shipment value)
2002	2,302,012	9.57
2003	2,376,827	9.69
2004	2,473,932	9.72
2005	2,687,441	9.39
2006	2,887,139	9.91
2007	3,011,358	10.07

Source: U.S. Census Bureau. *Annual Survey of Manufacturers, 2002-2007*

DOE obtained full production capacity utilization rates from the U.S. Census Bureau, "Current Industrial Reports," *Survey of Plant Capacity* from 2002 to 2006. Table 12.3.4 presents production capacity utilization rates for NAICS code 333415. Full production capacity is defined as the maximum level of production an establishment could attain under normal operating conditions. In the *Survey of Plant Capacity* report, the full production utilization rate is a ratio of the actual level of operations to the full production level.

Table 12.3.4 Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing Industry Full Production Capacity Utilization Rates

Year	Air Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing (%)
2002	60
2003	62
2004	60
2005	66
2006	63
Source: U.S. Census Bureau. 2007 <i>Current Industrial Reports: Table 1a - Full Production Capacity Utilization Rates by Industry: Fourth Quarters 2002 through 2006</i> . November 2007	

12.3.2 Interview Topics and Preliminary Findings

The following section summarizes information gathered during interviews held during the summer of 2009 for the preliminary MIA.

12.3.2.1 Market Shares and Industry Consolidation

Energy conservation standards can alter the competitive dynamics of the marketplace, prompting companies to enter the market, exit the market, or merge with other companies. The preliminary MIA interview questions asked manufacturers to share their perspectives on industry consolidation both in the absence of energy conservation standards and assuming standards at various efficiency levels. The interview questions focused on gathering information that assessed:

- current and anticipated market share in the event of standards;
- disproportionate cost increases to some manufacturers;
- likelihood of industry consolidation;
- increased proportion of fixed costs potentially increasing business risks; and
- potential barriers to market entry (e.g., proprietary technologies).

The need to assess anti-competitive effects of proposed energy conservation standards derives from the need to protect consumer interests. During the interviews, DOE also solicited information to determine whether energy conservation standards could result in disproportionate economic or performance penalties for particular consumer or user subgroups. Manufacturers were also asked if energy conservation standards could result in products that would be more or less desirable to consumers due to changes in product functionality, utility, or other features.

Market Shares. DOE inquired about current market shares of manufacturers in the walk-in cooler and freezer industry and how those shares might change after an energy conservation standard. One manufacturer said that a new standard could help them, but that they expect their market share to go down before it goes up, in part because the company could lose a price advantage on materials. Another manufacturer said that they do expect their market share to change once standards become effective, regardless of where the levels are set, but it could not determine whether it would increase or decrease. Another manufacturer said the effect of any

standard on its market share would depend on the level of enforcement. This company said that if the standards are not enforced, then it would impact the market share of those players not necessarily complying with standards. One manufacturer said that they would not expect their market share to change once standards become effective. This firm hopes that the standards will be fair and that people will comply, although they also said that there is no mechanism for compliance. This firm gave the example of the California regulations and stated that there are no penalties for non-compliance; so many competitors do not adhere to the standard.

Industry Consolidation. The walk-in cooler and freezer industry is relatively fragmented but has seen some consolidation in recent years. Manufacturers were generally mixed on how standards might affect consolidation. Most manufacturers expect consolidation to continue regardless of any standards, and several manufacturers said they would expect consolidation to increase as a result of standards. One firm said that some companies would go out of business or be acquired in the face of standards, while another thought standards would spur additional market entrants as well as vertical integration, expecting suppliers and customers to potentially enter the market. A common theme from manufacturers was that enforcement would play a major role in how standards might alter the market. In general, manufacturers stated that the greater the level of enforcement, the greater the level of consolidation that would ensue.

12.3.2.2 Production and Product Mix

DOE requested manufacturers' feedback on what they perceived to be the possible impact of energy conservation standards on profitability. For instance, the capital and product conversion outlays may be required to upgrade or redesign products before they have reached the end of their useful life, which could result in reduced cash flow and stranded investments. Higher energy conservation standards could also result in higher per-unit costs that could cause consumers to shift to less expensive products, if available.

Product Mix. Currently, a significant percentage of the overall market's production is customized to the customer's needs. Several manufacturers expressed concern that a stringent standard may affect their ability to customize their products. One manufacturer pointed out that approximately 70 percent of walk-in cooler and freezer equipment is custom-made, and that an overly stringent standard could hurt the custom products market. Other manufacturers stated that 70-80 percent of their sales are custom equipment. One manufacturer asserted that a reasonable energy conservation standard for walk-in coolers and freezers would allow for cost-effective, customized products to be developed. One firm also said that water-cooled units could be the only choice for tall buildings under a new standard, though not for water-restricted areas, because, water-cooled units are sometimes more efficient in certain indoor environments, and end-users in tall buildings could not site the condensing unit outdoors.

Product Utility. Some manufacturers expressed concerns that energy conservation standards might require changes in product functionality, utility, and other features that would make products less desirable to consumers. Some manufacturers were concerned that larger sized walk-in coolers and freezers could become a problem under a more stringent energy conservation standard. For example, if the insulation standard in the industry required panels to be thicker, this would be less desirable to customers because the larger walk-in units would leave

the customer with less available refrigerated space. This firm said that more stringent standards could reduce flexibility to cater to specific applications, which would reduce the functionality of the equipment. For example, this firm said that you could have an efficient product at a specific evaporator temperature, but need to operate at different one for the standard. This manufacturer also said that without enforcement of the new standard, the service of walk-in cooler and freezer equipment would be more expensive with the complex systems. They said that there could be a shift from service professionals that change parts to diagnosticians, as seen in cars, and this would substantially increase costs. Manufacturers stated that new unproven technologies required by any new standards could present challenges to product reliability.

12.3.2.3 Cumulative Regulatory Burden

While any one regulation may not impose a significant burden on manufacturers, the combined effects of several impending regulations may have serious consequences for some manufacturers, groups of manufacturers, or an entire industry. Assessing the impact of a single regulation may overlook this cumulative regulatory burden. For the cumulative regulatory burden analysis, DOE describes other significant equipment-specific regulations that could affect walk-in cooler and freezer manufacturers or their parent companies.

Based on its own research and discussions with manufacturers, DOE identified several regulations relevant to walk-in coolers and freezers, including:

- Refrigerant switch
- General DOE regulations
- Building codes and other

Refrigerant. Due to the phase-out of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), the walk-in cooler and freezer industry had to transition to non-ozone-depleting refrigerants. As a result, the industry has transitioned to hydrofluorocarbon-based (HFC-based) refrigerants in its walk-in cooler and freezer equipment.

Testing Costs. One manufacturer expressed a concern with the potential costs to meet testing requirements or to do outside testing. This firm said that the costs would be about \$5,000-\$10,000 per product to test meet fire and safety criteria of Underwriters Laboratories. Another manufacturer said that their testing costs would be 1.5 to 2.0 percent of sales for all of the regulations that they comply with. According to one manufacturer, these overall regulatory burden issues add about 10 to 20 percent to the cost of doing business.

Building Codes and Other Regulations. Several manufacturers are concerned with requirements for the National Sanitation Foundation's (NSF) certification requirements, which carry significant compliance costs. International, state, and local building codes present additional costs, including permit and inspection fees. Manufacturers also referenced disposal requirements they must comply with. One major problem, according to several firms, is the potential for conflicting regulations where a company cannot meet both, such as fire codes and the Montreal protocol for blowing agents.

12.3.3 Overall Key Issues

Perhaps the most important aspect of the preliminary MIA is the opportunity it creates for DOE to identify key manufacturer issues early in the development of energy conservation standards. During preliminary interviews, manufacturers identified several major issues that are detailed in the following sections.

12.3.3.1 Customer Impact

One manufacturer said that a new standard would have a negative impact on customers, down to the variety of foods and services that they could offer. This firm argued that a more stringent standard could make it more difficult for customers to buy fresh refrigerated foods.

One manufacturer said that unsophisticated customers may be hurt by the new standard. Several manufacturers said that small users/subgroups would be disproportionately affected, as these groups are more concerned about upfront costs than life cycle cost savings. They stated that convenience stores would be more affected than restaurants under the standard, because 75 percent of the equipment used in convenience stores is custom, which could potentially be restricted at certain standard levels. One manufacturer argued it would have to pass the costs along to customers, which would reduce new business starts and increase failures.

12.3.3.2 Product Repairs versus Product Replacement

Several manufacturers noted that an energy conservation standard could cause a trend to repair walk-in coolers and freezers rather than replace them. One manufacturer said that because prices would go up under the new standard, customers would prefer to repair their existing equipment upon failure rather than purchase new replacement equipment. Several manufacturers pointed out that customers may also opt to purchase several reach-in products rather than a single walk-in. Another manufacturer noted that currently customers are already repairing rather than replacing their units.

12.3.3.3 Shipments

Shipment projections can be a significant factor in determining the manufacturing impacts of energy conservation standards. The interviews provide an opportunity for manufacturers to share information that can help DOE quantify the magnitude of any changes in shipments resulting from energy conservation standards.

Several manufacturers expect shipments of walk-in coolers and freezers would decrease with standards because unit prices would increase. One manufacturer stated that a high incremental cost increase due to standards would drive lower total shipments, as consumers opt to repair rather than replace units, as discussed above. The manufacturer further stated that higher first cost would deter new businesses and restaurants from starting. The manufacturer estimated that a 5 percent cost increase would result in a 5 percent decrease in industry shipments; a 10 percent cost increase would result in a 7.5 percent shipment decrease; and a 25 percent cost increase would result in a 15 percent shipment decrease. Another firm estimated that a 5 percent price increase would lead to a 5 percent decline in shipments and a 10 percent

price increase would drive down sales by 20 percent due to business closures and substitutions by consumers.

On the other hand, a different manufacturer stated that standards would not change industry shipments unless the price increase was significant. The firm projected, for example, that a 25 percent increase would lower shipments by 5-10 percent. However, a 50 percent increase would drive shipments down by 10 to 15 percent and likely prohibit some new restaurants from opening.

12.3.3.4 Impact on Profitability and Outlook

DOE interviewed manufacturers about any potential change in their outlook that could arise from energy conservation standards.

One manufacturer said that a new standard, if reasonable, could help potentially help their business competitively because they are confident of their ability to comply. However, most firms expressed concern that stringent standards could result in higher production costs, lower shipments, and lower margins. In terms of conversion costs, several manufacturers expressed concerns that the new standard may force them to switch from board stock foam to polyurethane foam, which would require significant investments in the machinery necessary to produce the polyurethane foam. One manufacturer said that there are fewer suppliers of the type of board stock foam that complies with EISA for a four-inch panel.

One firm explained that the walk-in cooler and freezer industry is not a high margin industry, and small increases in costs can dramatically affect profitability. Shipping costs, for instance, which are a significant portion of the cost structure and do not benefit from economies of scale, could increase with larger, heavier units. A manufacturer argued that it is possible that shipments could decrease under standards but still require more delivery trucks because of the larger units.

12.3.3.5 Impact on Small Manufacturers

Several manufacturers said that small businesses would be at a competitive disadvantage under the standard because the capital investments required would have to be spread over fewer units. Because the smaller companies produce fewer units, it is more difficult for them to make a profit at the wholesale price. Another manufacturer said that a strict standard may also affect OEMs that make a portion of the product themselves, and these firms may not have the ability to meet the standard. A different manufacturer said that their outlook would only change if the standards were enforced.

12.3.3.6 Impact on Competitiveness of Manufacturers

One manufacturer said that whether the new standard would have an effect on the competitiveness of manufacturers in the industry depends on enforcement. This firm said that the competitive landscape would remain about the same unless rules were enforced. Assuming aggressive enforcement, many smaller players who may not be in compliance currently would go out of business. Another manufacturer stated that a standard's effect on industry competition depends on how stringent the standard is. If the standard is reasonable, this firm said that there

would not be a drastic effect. Some manufacturers stated that strong enforcement would benefit their competitive position.