CHAPTER 12: PRELIMINARY MANUFACTURER IMPACT ANALYSIS

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 12. PRELIMINARY MANUFACTURER IMPACT ANALYSIS

12.1 INTRODUCTION

The purpose of the manufacturer impact analysis (MIA) is to identify and quantify the potential impacts of energy conservation standards on manufacturers. The Process Rule provides guidance for conducting this analysis with input from manufacturers and other interested parties. The U.S. Department of Energy (DOE) will apply this methodology to its evaluation of standards to the extent that it is appropriate for developing energy conservation standards for the small electric motors covered under the preliminary analyses. The Process Rule provides guidelines for considering financial impacts and a wide range of quantitative and qualitative industry impacts that might occur after adoption of a standard. For example, a particular standard level could require changes in manufacturing practices for small electric motors. DOE will identify and analyze these impacts through interviews with manufacturers and other stakeholders during the notice of proposed rulemaking (NOPR) stage of its analysis.

DOE announced changes to the 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] Previously, DOE did not report any MIA results until the notice of proposed rulemaking stage (NOPR). However, under this new format, DOE collected, evaluated, and reported preliminary information and data in the period preceding the NOPR phase. Such preliminary information includes efficiency and market data, key issues, production mixes, conversion costs, foreign competition, market shares, industry consolidation, and cumulative regulatory information. DOE solicited this information during the preliminary manufacturer interviews and reports the results in this chapter. The appendices to this chapter include copies of the interview guides that DOE distributed to manufacturers to gather information for the preliminary MIA and other preliminary analyses.

12.2 METHODOLOGY

DOE will conduct the MIA in three phases. In Phase 1, DOE will create an industry profile to characterize the industry and conduct a preliminary MIA to identify important issues that require consideration. Sections 12.3 and 12.4 present DOE's initial findings from the Phase 1 analysis. In Phase 2, DOE will prepare an industry cash-flow model and an interview questionnaire to guide subsequent discussions. In Phase 3, DOE will interview manufacturers and assess the impacts of standards both quantitatively and qualitatively. DOE will assess industry and subgroup cash flow and net present value (NPV) using the Government Regulatory Impact Model (GRIM). DOE will then assess impacts on competition, manufacturing capacity, employment, and regulatory burden based on the manufacturer interviews and discussions. DOE will conduct Phases 2 and 3 in the NOPR phase of the rulemaking.

1 This report is available on the DOE website at www.eere.energy.gov/buildings/appliance_standards/pdfs/congressional_report_0807.pdf.

12.2.1 Phase 1: Industry Profile

In Phase 1 of the manufacturer impact analysis, DOE collects qualitative and quantitative financial and market information. This information includes wages, employment, and industry costs for small electric motors. Sources include reports published by industry groups, trade journals, the U.S. Census Bureau, and copies of Securities Exchange Commission (SEC) 10-K filings. DOE will also rely on information from its market and technology assessment, engineering analysis, life-cycle cost analysis, and analysis of consumer prices to characterize the small electric motor manufacturing industry.

12.2.2 Phase 2: Industry Cash-Flow Analysis and Interview Guide

In Phase 2, DOE will perform a preliminary industry cash-flow analysis and prepare written guidelines for interviewing manufacturers.

12.2.2.1 Industry Cash-Flow Analysis

DOE will use the GRIM to analyze the financial impacts of energy conservation standards on the small electric motor industry. Standards may require additional investment, raise production costs, and affect revenue through higher prices and possibly lower sales. The GRIM uses several factors to determine a series of annual cash flows for the year that standards become effective and for several subsequent years. These factors include annual expected revenues; sales costs; selling and general administration costs; taxes; and capital expenditures related to depreciation, new standards, and maintenance. Inputs to the GRIM include manufacturing costs, shipment forecasts, and price forecasts developed in other analyses. DOE develops another input, financial information, based on publicly available data and confidentially submitted manufacturer information. DOE compares the results of the GRIM against baseline projections where no standards are in place. The financial impact of new standards is the difference between the two sets of discounted annual cash flows.

12.2.2.2 Interview Guide

DOE will conduct interviews with manufacturers to gather information on the effects of standards on revenues and finances, direct employment, capital assets, and industry competitiveness. These interviews will take place during Phase 3 of the MIA. Before the interviews, DOE will distribute an interview guide that will help identify the impacts of standards on individual manufacturers or subgroups of manufacturers. The interview guide will likely cover current organizational characteristics; industry infrastructure; manufacturer cash-flow analysis; and assessments of the impact on competition, employment, and manufacturing capacity.

12.2.3 Phase 3: Subgroup Analysis

Phase 3 activities will occur after publication of the notice of public meeting (NOPM). These activities will include manufacturer interviews; revision of the industry cash-flow analysis; a manufacturer subgroup cash-flow analysis; and assessment of the impacts on competition, manufacturing capacity, employment, and the cumulative regulatory burden.

12.2.3.1 Manufacturer Interviews

DOE will supplement the information gathered in Phase 1 and the cash-flow analysis performed in Phase 2 with information gathered during interviews with manufacturers during Phase 3. The interview process has a key role in the manufacturer impact analyses, because it provides an opportunity for interested parties to express their views privately on important issues. This allows consideration of confidential or sensitive information during the rulemaking decision.

DOE will conduct detailed interviews with manufacturers to gain insight into the potential impacts of standards on sales, direct employment, capital assets, and industry competitiveness. Both qualitative and quantitative information are valuable. Interviewees schedule meetings well in advance to provide every opportunity for key individuals' participation and comment. Although a written response to the questionnaire is acceptable, DOE prefers an interactive interview process, which helps clarify responses and provides the opportunity to identify additional issues.

DOE asks all manufacturers who participate in the interviews to identify all confidential information provided during and after the interview. DOE will consider all information transmitted in its decision-making process; however, will not make confidential information available in the public record. Also, DOE will ask participants to identify any information they wish to include in the public record but do not want attributed to them.

12.2.3.2 Revised Industry Cash-Flow Analysis

In Phase 2 of the MIA, DOE will prepare a preliminary GRIM. During the interviews, DOE will seek comments about the values DOE selected for the parameters. DOE will use the feedback provided during the interviews to revise its industry cash-flow model.

12.2.3.3 Manufacturer Subgroup Analysis

Using average cost assumptions to develop an industry cash-flow estimate is not adequate for assessing differential impacts among subgroups of manufacturers. Standards could negatively affect smaller manufacturers, niche players, or manufacturers exhibiting a cost structure that differs largely from the industry average. Ideally, DOE would consider the individual impact on each firm. However, DOE typically uses the results of the industry characterization to group manufacturers with similar characteristics. During the interviews, DOE will discuss the potential subgroups that have been identified for the analysis. DOE will ask manufacturers and other stakeholders to suggest which subgroups or characteristics are most appropriate for the analysis.

12.2.3.4 Competitive Impact Analysis

Section 342(a)(6)(B)(i)(V) of the Energy Policy and Conservation Act (EPCA), 42 U.S.C. 6313(a)(6)(B)(i)(V), directs DOE to consider any lessening of competition likely to result from imposition of standards. It further directs the U.S. Attorney General to determine the impacts, if any, of any decrease in competition. DOE will make a determined effort to gather

and report firm-specific financial information and impacts. The competitive analysis will focus on assessing the impacts on smaller manufacturers. Manufacturing cost data and information collected from interviews with manufacturers will provide the basis of the assessment. The manufacturer interviews will focus on gathering information that would help in assessing asymmetrical cost increases to some manufacturers, the potential increase in business risks from an increased proportion of fixed costs, and potential barriers to market entry (*e.g.*, proprietary technologies).

12.2.3.5 Manufacturing Capacity Impact

A potentially significant outcome of standards is the obsolescence of existing manufacturing assets, including tooling and investment. The manufacturer interview guide will have a series of questions to help identify impacts on manufacturing capacity, specifically capacity utilization and plant location decisions in the United States and North America with and without a standard; 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 new energy conservation standards on employment is an important consideration in the rulemaking process. To assess affects on domestic employment patterns, the interviews will explore current employment trends in the motor industry and solicit manufacturer views on changes in employment patterns that may result from increased standard levels. The employment impacts section of the interview guide will focus on current employment levels associated with manufacturers at each production facility, expected future employment levels with and without a standard, differences in workforce skills, and issues related to employee retraining.

12.2.3.7 Cumulative Regulatory Burden

DOE seeks to mitigate the overlapping effects on manufacturers of standards and other regulatory actions affecting the same equipment or companies. Based on its own research and discussions with manufacturers, DOE has yet to identify regulations that cover the same set of motors covered in the preliminary analyses.

12.3 PRELIMINARY MANUFACTURER IMPACT OVERVIEW

During the period preceding the NOPR, DOE identified qualitative and quantitative public financial and market information to help evaluate the impact of potential new regulations on small electric motor manufacturer financial performance, manufacturing capacity and employment levels, and product utility and innovation. DOE also researched the cumulative burden that industry may face from the overlapping effect of new or recent energy conservation standards or other regulatory action affecting the same product or industry.

In addition to researching publicly available data, DOE conducted interviews with manufacturers primarily to identify key issues and gain insights into the qualitative impacts of

energy conservation standards. The primary sources of this information were interviews with manufacturers of small electric motors conducted during the last quarter of 2007 and the first quarter of fiscal year 2008. To maintain confidentiality, DOE did not identify the individual manufacturers that disclosed information. Instead, the evaluation only reports aggregated information and does not disclose sensitive or company-specific information. DOE used an interview guide to gather responses from multiple manufacturers on several issues. Appendix 12A contains a copy of the preliminary manufacturer interview guide DOE used for small electric motor manufacturers.

The following sections summarize publicly available data as well as information gathered during interviews for the preliminary manufacturer impact analysis. Section 12.3.1 summarizes the publicly available industry data. Section 12.3.2 outlines the general interview structure and summarizes the issues discussed during the preliminary MIA interviews. Section 12.4 addresses major manufacturer-related issues for motors covered in the preliminary analyses.

12.3.1 Overview of Industry Data

DOE compiled industry data to assess the motor industry cost structure and manufacturing utilization and capitalization rates. The following sections summarize public data DOE obtained from U.S. Census Bureau reports.

12.3.1.1 Industry Cost Structure

DOE developed the motor and generator industry cost structure from the U.S. Census Bureau, *Annual Survey of Manufacturers, Statistics for Industry Groups and Industries: 2005.* Table 12.3.1 presents the motor industry employment levels and earnings for this period. The data show about an 18-percent decrease in the number of production workers, and about a 13-percent decrease in the overall number of employees in the industry.

Table 12.3.1 Motor and Generator Employment and Earnings[i]

Year	Production Workers	All Employees	Payroll for All Employees (thousand 2005 dollars)
2002	41,272	54,906	1,840,379
2003	36,357	49,409	1,739,725
2004	34,944	48,143	1,755,630
2005	33,989	47,580	1,831,619

Table 12.3.2 presents the costs of materials and industry payroll as a percentage of shipment value from 2002 to 2005. The cost of materials increased in that period, whereas the cost of payroll (both production and total) decreased.

Table 12.3.2 Motor and Generator Industry Census Data[ii]

Year	Cost of Materials (% of shipment value)	Cost of Payroll for Production Workers (% of shipment value)	Cost of Total Payroll: Production + Administration (% of shipment value)
2002	47.0	12.8	32.9
2003	48.3	11.9	30.7
2004	50.0	10.8	27.8
2005	51.3	9.8	25.6

12.3.1.2 Inventory Levels and Capacity Utilization Rates

Table 12.3.3 shows the year-end inventory for the motors industry obtained from the U.S. Census Bureau, *Annual Survey of Manufacturers, Statistics for Industry Groups and Industries: 2005*. The dollar amount of end-of-year inventory has increased, but the inventory as a percentage of annual shipment value has decreased slightly.

Table 12.3.3 Motor and Generator Industry Census Data[iii]

Year	End-of-Year Inventory (thousand 2005 dollars)	End-of-Year Inventory (% of shipment value)
2002	1,252,225	13.7
2003	1,242,783	13.4
2004	1,384,081	13.4
2005	1,496,582	13.0

DOE obtained full production capacity utilization rates from the U.S. Census Bureau, Current Industrial Reports, *Survey of Plant Capacity from 2001 to 2005*. Table 12.3.4 shows production capacity utilization rates for the motor and generator industry. Full production capacity is defined as the maximum level of production that 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 Full Production Capacity Utilization Rates[iv]

Year	Motor and Generator Manufacturing (%)
2001	61
2002	60
2003	62
2004	75
2005	59

12.3.2 Preliminary Manufacturing Interview Overview

In addition to reviewing publicly available data, DOE interviewed manufacturers for a preliminary manufacturer impact analysis. The following section highlights topics discussed during these interviews.

12.3.2.1 Key Issues

Perhaps the most important aspect of the preliminary MIA is the opportunity that it creates for DOE to identify key manufacturer issues early in the development of new standards. During the interviews, DOE engages manufacturers in a discussion about what they perceive as the key issues in the rulemaking. Key issues in previous rulemakings have included concerns over patents that may prevent some companies from implementing higher-efficiency designs.

12.3.2.2 Production and Product Mix

DOE asks manufacturers what they perceive as the possible impact of new standards on profitability. For instance, the capital and product conversion outlays needed to upgrade or redesign products before they have reached the end of their useful life may create significant conversion costs, resulting in reduced cash flow and stranded investments. Higher energy conservation standards may also result in higher per-unit costs that could cause consumers to shift to less costly products.

12.3.2.3 Compliance Costs

During the interviews, DOE asks manufacturers to quantify and explain both the capital and the product conversion costs necessary to raise the energy efficiency of their product lines to the proposed standard levels. In some instances, manufacturers may meet proposed standard levels by modifying existing products. In other cases, the necessary changes may entail a complete product-line redesign. In these situations, an increase in a standard will cause manufacturers to incur one-time conversion capital expenditures and product-conversion expenses. Conversion capital expenditures are one-time investments in property, plant, and equipment. Product-conversion expenses include one-time investments in research, product development, testing, and marketing.

A potentially significant outcome of new standards is the obsolescence of existing manufacturing assets, including tooling and other capital investment. The interview guide includes questions to identify impacts on manufacturing capacity. DOE developed these questions to understand the impact of potential new standards on four areas:

- U.S. and North American manufacturing capacity;
- capacity utilization and plant location decisions in the United States and North America with and without standards;
- the ability of manufacturers to upgrade or remodel existing facilities to accommodate a new product mix; and
- the nature and value of stranded assets, if any.

DOE will explore current trends in production employment and solicit manufacturer views on changes in employment patterns resulting from new energy conservation standards. Information from manufacturers about employment impacts help DOE to understand current employment levels associated with manufacturing at each production facility, expected future employment levels with and without new standards, and differences in workforce skills and issues related to retraining.

12.3.2.4 Exports, Foreign Competition, and Outsourcing

Energy conservation standards for small electric motors can affect projected export sales, the portion of the domestic market served by foreign competition, and domestic production levels. The preliminary MIA interview questions examined manufacturer views on the impacts new standards would have on exports, foreign competition, and outsourcing.

12.3.2.5 Market Shares and Industry Consolidation

New 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 ask manufacturers to share their perspectives on industry consolidation both in the absence of new standards and assuming new standards at various efficiency levels. The interview questions focus on information that helps DOE assess disproportionate cost increases to some manufacturers, increased proportion of fixed costs potentially increasing business risks, and potential barriers to market entry (*e.g.*, proprietary technologies).

The need to assess anticompetitive effects of proposed standards comes from the need to protect consumer interests. During the interviews, DOE solicits information to understand whether new standards could result in disproportionate economic or performance penalties for particular consumer or user subgroups. Manufacturers are also asked whether new standards could result in more or less desirable products due to changes in product functionality, utility, or other features.

12.3.2.6 Cumulative Burden

A single regulation might not impose a significant burden on manufacturers, but several impending regulations may have a combined effect with serious consequences for individual manufacturers, groups of manufacturers, or entire industries. Assessing the impact of a single regulation may overlook this cumulative regulatory burden.

Expenditures associated with meeting other regulations are an important aspect of DOE's consideration of the "cumulative regulatory burden" that the industry faces. The interviews help DOE identify the level and timing of investments that manufacturers expect to incur because of these regulations. DOE also asks manufacturers which circumstances will allow them to make expenditures related to regulations and standards.

12.4 SUMMARY OF MAJOR ISSUES FROM PRELIMINARY MIA

DOE conducted a series of preliminary interviews with manufacturers to assess their concerns about the potential impact of a regulatory standard for small electric motors. In general, manufacturers identified three major issues of concern: (1) capital expenditure to retool in response to the standards, (2) maintaining product availability and consumer-oriented features, and (3) enforcement of the new standards.

12.4.1 Capital Expenses to Produce Standards-Compliant Small Electric Motors

The manufacturers DOE interviewed expressed concern over the costs they would incur in order to produce standards-compliant small electric motors. Large manufacturers of electric motors, who produce the small electric motors covered by the preliminary analyses as well as many other categories of motors, dominate the majority of the small electric motors market. Manufacturers indicated that the proportion of covered small electric motors represents a small share of the manufacturer's overall business. The increased stringency at each standard level will force manufacturers to increase the amount of capital expenditure, potentially forcing an investment in new lamination dies, winding tooling, and testing equipment, and even re-allotting factory floor space. If the standard is set too high, manufacturers indicated that they may simply stop producing small electric motors rather than develop standards-compliant units.

Small manufacturers of small electric motors represent a fraction of the overall national market, and they also have fewer sources from which to raise money for an investment. DOE is concerned that small manufacturers may choose to leave the small electric motors market altogether instead of dealing with the extra difficulty of raising the capital necessary for a small electric motors regulation.

12.4.2 Maintaining Product Availability and Features

Manufacturers expressed concern about the impact on typical motor characteristics that may result from the selection of an efficiency level that is too high. Specifically, manufacturers are concerned that small electric motors will need to increase diameter, length, and other dimensions if efficiency levels are pushed high enough. Some horsepower ratings may also consolidate, eliminating some of today's standard ratings from the market. Manufacturers expressed concerned over the ability to retrofit newer, potentially larger motors into existing applications. End users would then have to choose another horsepower or another motor category that is not covered, or modify the application to allow installation of the standards-compliant small electric motor.

12.4.3 Enforcement of Standards

Manufacturers also expressed major concerns about the feasibility of enforcing the energy conservation standard. If an efficiency level is established, the standard will require some investment for all manufacturers that choose to continue to produce small electric motors. Manufacturers expressed concern about the inability to enforce the standard level, particularly for motors embedded in other equipment. They worry that their investment in standards compliance may put them at a competitive disadvantage to less scrupulous manufacturers. This

concern was expressed particularly in the context of foreign companies importing non-compliant motors (potentially as a part of some other equipment) that may put U.S. manufacturers at a competitive disadvantage.

[i]U.S. Census Bureau. *2005 Annual Survey of Manufacturers. Statistics for Industry Groups and Industries: 2005.* Table 2. Statistics for Industry Groups and Industries: 2005 and Earlier Years. November 2006, www.census.gov/prod/2006pubs/am0531gs1.pdf. (Last accessed April 9, 2008.) The April 9, 2008, material from this website is available in Docket No. EERE-2007-BT-STD-0007. For more information, contact Brenda Edwards at (202) 586-2945.

[ii]U.S. Census Bureau. *2005 Annual Survey of Manufacturers. Statistics for Industry Groups and Industries: 2005.* Table 2. Statistics for Industry Groups and Industries: 2005 and Earlier Years and Table 7. Value of Shipments by Industry: 2005 and 2004. November 2006, www.census.gov/prod/2006pubs/am0531gs1.pdf. (Last accessed April 9, 2008.) The April 9, 2008, material from this website is available in Docket No. EERE-2007-BT-STD-0007. For more information, contact Brenda Edwards at (202) 586-2945.

[iii]U.S. Census Bureau. *2005 Annual Survey of Manufacturers. Statistics for Industry Groups and Industries: 2005.* Table 6. Value of Manufacturers' Inventories by Stage of Fabrication for Industry Groups and Industries: Beginning and End of Year. November 2006, www.census.gov/prod/2006pubs/am0531gs1.pdf. (Last accessed April 9, 2008.) The April 9, 2008, material from this website is available in Docket No. EERE-2007-BT-STD-0007. For more information, contact Brenda Edwards at (202) 586-2945.

[iv]U.S. Census Bureau. *Current Industrial Reports. Survey of Plant Capacity: 2005.* Table 1a. Full Production Capacity Utilization Rates by Industry: Fourth Quarters 2001 through 2005. January 2007, www.census.gov/prod/2007pubs/mqc1-05.pdf. (Last accessed April 9, 2008.) The April 9, 2008, material from this website is available in Docket No. EERE-2007-BT-STD-0007. For more information, contact Brenda Edwards at (202) 586-2945.