July 18, 2014

Jengeih Tamba
U.S. Department of Energy
Office of the General Counsel
1000 Independence Avenue, SW., Room 6A245
Washington, DC 20585

Re: Regulatory Burden Request for Information [Docket No. EERE–2013–BT–NOC–0039]

Dear Jengeih:

These comments are submitted by Goodman Global, Inc. ("Goodman") in response to the U.S. Department of Energy's (DOE) request for information (RFI) appearing in the Federal Register on July 3, 2014. The document pertains to DOE seeking comments and information from interested parties to assist DOE in reviewing its existing regulations to determine whether any such regulations should be modified, streamlined, expanded, or repealed.

Goodman manufactures residential and light commercial heating and cooling equipment. Our products are sold and installed by contractors in every state within the United States. Goodman is a member of Daikin group, the largest HVAC manufacturer in the world. Although we appreciate the opportunity to comment on the specific issues raised within this DOE notice, we believe that the 15-day comment period associated with this RFI is inadequate and makes it nearly impossible for stakeholders to provide substantive comments that could aid DOE in making its regulatory program more effective and less burdensome. However, we are making our best attempt to adequately answer the questions raised within the RFI in the best possible manner despite the short comment period deadline set by DOE.

Section 1 – Study on Costs of Federal Regulations on Manufacturers

Exhibit 1 provides a report on a study that was conducted by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) in May 2013 to determine the costs of federal regulations for the industry. We recommend that DOE take into consideration the findings that have been published within this report.

The study states that between 2006 and the beginning of 2013, manufacturers of residential furnaces, air conditioners, heat pumps and commercial unitary air conditioners have incurred $250 million in costs above those associated with the normal course of doing business as a result of energy and environmental regulations. (Residential furnace manufacturers alone have incurred a cost of over $50 million within this time period.) The study also states that for the period from 2013 through 2015, these manufacturers will incur costs of $50-55 million:

- $20 million for monitoring and participating in the regulatory process
- $10 million for duplicate reporting requirements
- $10-15 million for commercial products testing and compliance procedures
- $10 million in association costs for regulatory participation

Section 2 – Answers to Questions Raised by DOE

For some questions, we have no immediate response in this abbreviated response time.

(1) How can the Department best promote meaningful periodic reviews of its existing rules and how can it best identify those rules that might be modified, streamlined, expanded, or repealed?

Answer: We believe that DOE can best promote meaningful period reviews by increasing the opportunities for stakeholder input throughout the rulemaking process. We suggest that DOE hold an open stakeholder meeting on a quarterly or semi-annual basis, as we believe all stakeholders can work together to develop more robust, less burdensome rules. Having such a meeting a month or two before the due date of DOE's semiannual Unified Agenda of Federal Regulatory and Deregulatory Actions (Agenda) might be beneficial for both DOE and stakeholders. The timing could be such that there would be minimal additional effort on DOE's behalf, and in the long run the input from stakeholders might likely reduce manpower needs due to increased efficiency downstream.

Further, as DOE cites in this RFI, the use of a negotiated rulemaking can be very momentous in aiding the overall rulemaking process. The example DOE provides is the Alternative Efficiency Determination Method (AEDM) final rule being a success with respect to reducing the regulatory burden on industry; the outcome of this final rule was based on a negotiated rulemaking effort via a several stakeholder meetings. A major reason for the success of this process was the fact that stakeholders were allowed to engage in frequent discussions over a period of a few months, so that a consensus based solution could be developed. DOE should consider implementing the benefits associated with such a process more often.

The current DOE rulemaking process goes through a period of several months between various stages such as the issuance of a request for information, notice of data availability, framework document, notice of proposed rulemaking (NOPR), and a final rule. We understand that DOE must define and follow procedures in accordance with the Administrative Procedures Act (APA), however between the current stages, stakeholders are not provided any opportunity to freely enter into discussions with DOE or its consultants on the analyses that eventually render a final rule technologically feasible and economically justified. DOE can better promote meaningful rules by allowing additional stakeholder engagement between the various stages of a rulemaking process. It is common practice in industry to have monthly (or weekly) reviews of major projects, and we would encourage that DOE take a similar approach on major rulemakings. Alternatively, as a minimum, we would encourage that DOE take an initiative more often

on current and future rulemaking activities such as the one recently taken to respond to stakeholder concerns via the scheduling of a public meeting on June 19, 2014. The purpose of this meeting was to discuss the energy model used in the engineering analysis supporting its energy conservation standard rulemaking for automatic commercial ice makers. During the meeting, DOE provided detailed description of its energy model and demonstrated its use.

In contrast, we suggest that DOE avoid occurrences of allowing too little time for stakeholder input or review of information. As an example, DOE made what we believe are substantive changes during the eight month period between issuance of the residential furnace fan NOPR on October 25, 2013 and the final rule issued on July 3, 2014; however, stakeholders did not receive a chance to weigh in on the changes to the Government Regulatory Impact Model (GRIM), life cycle cost analysis, and national impact analysis spreadsheet tools.

Further, we understand that DOE conducts its own testing as well as performs testing to validate data provided by various stakeholders during the NOPR process, and such test data is specifically designated as confidential business information. However, we believe that certain aspects of the data can be shared, even in real time rather than waiting until the next stage of the rulemaking process. We believe that working together to determine what high level information of test data that can be shared would be mutually beneficial to all stakeholders, including DOE.

DOE can issue more effective rules by using more consideration and deliberation of stakeholders' comments and in DOE's subsequent responses to such comments. Some examples are (we can provide more details on each if requested):

- In response to the residential furnace fan rulemaking NOPR, several stakeholders commented DOE had double-counted energy savings of furnace fans in the cooling mode by including the savings in both the residential furnace fan rulemaking and the latest central air conditioner (CAC) rulemaking that goes into effect January 1, 2015. DOE response has been inconsistent; on one hand, DOE does not acknowledge that the final FER requirements result in the double-counting of energy savings, but on the other hand DOE specifically states in the July 3, 2014 residential furnace fan final rule that a reduction in energy use by the furnace fan would improve the CAC operating efficiency.

- Also in response to the residential furnace fan rulemaking NOPR, some stakeholders commented it was implausible that the furnace fan rulemaking could save more energy than the June 27, 2011 direct final rule in its entirety (including air conditioners, heat pumps, and furnaces, operating in cooling mode, heating mode and standby/off mode). DOE did not provide any figures or statistics to justify its response, merely brushing off the feedback.

- In regards to the rulemaking for products in ASHRAE 90.1-2013, we are concerned that DOE is not giving adequate recognition to the process by which minimum efficiency standards are established in ASHRAE Standard 90.1. Additionally, recognizing that DOE does monitor and support the activities of ASHRAE Standing Standards Project Committee (SSPC) 90.1 via national laboratories, we are concerned that some of the

issues raised in this NODA were not previously identified when the revised minimum efficiency standards were being developed by SSPC 90.1.

(2) What factors should the agency consider in selecting and prioritizing rules and reporting requirements for review?

Answer: DOE should ensure that all pertinent documents such as final rules and reporting templates be issued well in advance of the reporting deadlines for manufacturers.

As an example, despite the fact that manufacturers were required to submit their certification data to DOE by July 1, 2014, the Compliance Certification Management System (CCMS) templates for commercial warm air furnaces, package terminal air conditioners and package terminal heat pumps were only made publicly available by DOE towards the end of June 2014. DOE should avoid creating such tight deadlines for manufacturers when it comes to reporting requirements. While we understand the final rules associated with these commercial products were issued earlier (78 FR 79579 and 79 FR 25486), a timely release of the CCMS templates would have ensured that all manufacturers populated their data in a consistent manner. Instead, the delay in the issuance of these templates created a sense of panic within our industry and forced manufacturers to:

a) Predict and create their own reporting templates based on the certification reporting requirements specified within the May 5, 2014 DOE final rule.
b) Revise data reporting upon the issuance of new CCMS templates in late June 2014 due to formatting differences between the DOE templates and manufacturers' custom templates that were generated based on manufacturers' interpretations of the May 5, 2014 DOE final rule.

Given that such circumstances created by DOE could make manufacturers susceptible to reporting errors and subject them to enforcement penalties in the future, DOE should make every effort to provide industry with adequate time to generate certification reports. Manufacturers should have a period of at least six months from the issuance of a final rule and the corresponding CCMS templates to submit certification reports to DOE.

The following examples suggest that DOE has been unable to meet its own statutory deadlines over the past few years:

- DOE issued a direct final rule for residential CACs, heat pumps and furnaces on in June 2011. The Energy Independence and Security Act (EISA) of 2007 required that a final rule for enforcement be issued by DOE not later than 15 months after the final rule that establishes a regional standard. It is likely that DOE will not issue a final rule for enforcement before 2015 – about two years past the statutory deadline to publish such a rule.
- Per EISA of 2007, DOE was required to issue the residential furnace fan final rule by December 31, 2013. Instead, DOE issued the final rule on July 3, 2014.

Whatever the reasons may be for DOE not meeting its statutory deadlines, DOE must ensure that undue regulatory burden is not passed on to manufacturers when such deadlines are not met by DOE. Instead, DOE should make every effort to move the effective date based on the delay associated with the issuance of a final rule.

(3) Are there regulations that are or have become unnecessary, ineffective, or ill advised and, if so, what are they? Are there rules that can simply be repealed without impairing the Department's regulatory programs and, if so, what are they?

Answer: Yes, with the promulgation of several DOE rules over the past few years, we are reaching a point where a covered product's energy efficiency attributes are represented by several metrics. Some examples of covered products that have multiple regulated metrics are:

- Furnaces – Annual Fuel Utilization Efficiency (AFUE), maximum standby mode electrical power consumption, maximum off mode electrical power consumption, and FER.
- CACs – SEER, EER, average off mode power consumption, and an influence of FER due to double-counting.

We believe that DOE, except for EER and SEER, has a statutory requirement to have only a single metric in each mode of operation. Having a single metric per mode will significantly reduce the burden on manufacturers to test and certify their covered products. Additionally, it will make it easier for consumers to make purchasing decisions based on a single efficiency metric. In our judgment and experience, multiple metrics only heighten the possibility of consumer confusion. Additionally, a single metric would also simplify the formatting of the EnergyGuide label that is required on covered residential products. The following references within existing statutory language already support such an approach:

- Section 310(3)(A) of EISA 2007 states that "In general.--Subject to subparagraph (B), based on the test procedures required under paragraph (2), any final rule establishing or revising a standard for a covered product, adopted after July 1, 2010, shall incorporate standby mode and off mode energy use into a single amended or new standard, pursuant to subsection (o), if feasible."
- 42 U.S.C. 6293(b)(3) states that "Any test procedures prescribed or amended under this section shall be reasonably designed to produce test results which measure energy efficiency, energy use, water use (in the case of showerheads, faucets, water closets and urinals), or estimated annual operating cost of a covered product during a representative average use cycle or period of use, as determined by the Secretary, and shall not be unduly burdensome to conduct."
- 42 U.S.C. 6295 (o)(5) states that "The Secretary may set more than 1 energy conservation standard for products that serve more than 1 major function by setting 1 energy conservation standard for each major function." The advent of the FER metric appears to violate this regulatory requirement since it accounts for annual cooling hours. (The cooling function is already captured by the SEER metric.)

(4) Are there rules or reporting requirements that have become outdated and, if so, how can they be modernized to accomplish their regulatory objectives better?

Answer: No comment.

(5) Are there rules that are still necessary, but have not operated as well as expected such that a modified, stronger, or slightly different approach is justified?

Answer: No comment.

(6) Does the Department currently collect information that it does not need or use effectively to achieve regulatory objectives?

Answer: No comment.

(7) Are there regulations, reporting requirements, or regulatory processes that are unnecessarily complicated or could be streamlined to achieve regulatory objectives in more efficient ways?

Answer: Appendix A to Subpart of 10 CFR Part 430 establishes procedures, interpretations and policies to guide the DOE in the consideration and promulgation of new or revised appliance efficiency standards under EPCA. Section 7(c) within this appendix clearly states the following:

"*Issuing final test procedure modification*. Final, modified test procedures will be issued prior to the NOPR on proposed standards."

DOE staff has not met this requirement on two occasions:

a) Residential furnace fans – test procedure final rule was issued on January 3, 2014 whereas energy conservation standards NOPR was issued on October 25, 2013.
b) Air conditioners and heat pumps – June 27, 2011 direct final rule specified off mode standards for such products. The test procedure final rule has not yet been issued.

DOE must ensure that the test procedure requirements specified within section 7 are followed. In the case of residential furnace fans, the 20 calendar days between the publication of the test procedure final rule on January 3, 2014 and the close of the standards NOPR comment period on January 23, 2014 simply did not provide interested parties with sufficient time to assess the energy conservation standards NOPR based on the provisions within the final test procedure.

Manufacturers do not have unlimited resources to spend when it comes to testing during a NOPR or SNOPR stage. Apart from the fact that Appendix A to Subpart of 10 CFR Part 430 does not permit DOE to issue a standards NOPR prior to the issuance of a final test procedure, DOE needs to recognize that it is impractical for manufacturers to begin any testing during a test procedure NOPR stage due to limited resources, and the

impracticality of attempting to fully comprehend the impact of proposed standards if manufacturers do not specifically know via a final test procedure on how their products need to be tested.

(8) Are there rules or reporting requirements that have been overtaken by technological developments? Can new technologies be leveraged to modify, streamline, or do away with existing regulatory or reporting requirements?

Answer: No comment.

(9) How can the Department best obtain and consider accurate, objective information and data about the costs, burdens, and benefits of existing regulations? Are there existing sources of data the Department can use to evaluate the post-promulgation effects of regulations over time? We invite interested parties to provide data that may be in their possession that documents the costs, burdens, and benefits of existing requirements.

Answer: Refer to section 1 of this letter.

(10) Are there regulations that are working well that can be expanded or used as a model to fill gaps in other DOE regulatory programs?

Answer: No comment.

Section 3 – Concluding Remarks

Goodman appreciates the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me.

Sincerely,

Gary Clark/axr

Digitally signed by Gary Clark/axr
DN: cn=Gary Clark/axr gn=Gary Clark/axr c=United States l=US e=gary.clark@goodmanmfg.com
Reason: I am the author of this document
Location:
Date: 2014-06-23 16:10-04:00

Gary Clark
Senior Vice President of Marketing
Tel: 713/263-5439

Email: gary.clark@goodmanmfg.com

Exhibit:

1. AHRI Project 5001 – Costs of Federal Regulations for Residential Heating and Air Conditioning Equipment Manufacturers

Exhibit 1

AHRI Project 5001 – Costs of Federal Regulations for Residential Heating and Air Conditioning Equipment Manufacturers

Prepared for:
Air-Conditioning, Heating and Refrigeration Institute (AHRI)

AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE

we make life better™

May 2013

Everett Shorey
Richard F. Topping

RFTopping Consultants, LLC

Shorey Consulting, Inc.

Table of Contents

Executive Summary i
Situation 1
Summary Conclusions 1
Regulatory Framework and Analysis 3
Structure of the Analysis 4
Residential Air Conditioners and Heat Pumps 4
- Monitoring and Participating 5
- Designing 7
- Complying 9

Furnaces 11
- Monitoring and Participating 12
- Designing 13
- Complying 14

Commercial Unitary Air Conditioners and Related Equipment 14
- Monitoring and Participating 15
- Designing 17
- Complying 17

Future Costs 18
Underlying Causes 20
- Non-Administrative Actions 20
- Administrative Actions 20
- Lack of Coordination 21
- Policy Differences 21

Appendix A – Cumulative Regulatory Burden – Data Collection 22

Executive Summary

The federal government issues a variety of regulations directly affecting the manufacturers of heating and air conditioning equipment (in addition to the wide range of health, safety, employment and other regulations that affect all businesses). In order to comply with these regulations, manufacturers divert effort and money from other activities that produce products with benefits to consumers. The more effectively the federal government manages its regulatory programs, the lower the cost burden for all stakeholders – manufacturers, environmental groups, the government itself and, ultimately, consumers. The purpose of this study is to document the costs to manufacturers of federal energy regulations and to understand some of the underlying causes for those costs. The study is based on a survey of air conditioner and furnace manufacturers to determine their activities and associated costs.

Between 2006 and the beginning of 2013, manufacturers of residential furnaces, air conditioners, heat pumps and commercial unitary air conditioners have incurred $250 million in costs above those associated with the normal course of doing business as a result of energy and environmental regulations:

- Residential air conditioners and heat pumps: $140+ million
- Residential furnaces: $50+ million
- Commercial unitary air conditioners: $35 million
- Association costs for regulatory participation: $23 million

For the period from 2013 through 2015, these manufacturers will incur costs of $50-55 million:

- $20 million for monitoring and participating in the regulatory process
- $10 million for duplicate reporting requirements
- $10-15 million for commercial products testing and compliance procedures
- $10 million in association costs for regulatory participation

These costs are related to the sheer number of filings and rulemakings from the Department of Energy and other agencies, lack of coordination between agencies and policy decisions. The largest portion of the costs is due to a lack of coordination leading to more rapid design cycles and differing reporting requirements. This amounts to waste where manufacturers bear costs for no environmental or energy conservation gains.

Costs of Federal Regulations for Residential Heating and Air Conditioning Equipment Manufacturers

Situation

The federal government issues a variety of regulations directly affecting the manufacturers of heating and air conditioning equipment (in addition to the wide range of health, safety, employment and other regulations that affect all businesses). How the federal government manages the regulatory process has a significant effect on the costs and activities required from heating and air conditioning equipment manufacturers as well as causing costs and other requirements to ripple through the distribution and supplier channels.

Ineffective management of these programs by the Federal government (DOE, EPA, FTC, etc.) not only increases the costs of the regulatory process but also diverts engineering and other management resources away from new product development and other activities. Effective management allows the federal government to achieve its policy objectives without excessive burden. The purpose of this paper is to indicate where and how ineffective actions have increased the regulatory burden and to suggest some of the possible causes of excess costs.

Summary Conclusions

Between 2006 and the beginning of 2013, manufacturers of residential furnaces, air conditioners, heat pumps and commercial unitary air conditioners have incurred $250 million in costs above those associated with the normal course of doing business as a result of energy and environmental regulations:

- Residential air conditioners and heat pumps: $140+ million
- Residential furnaces: $50+ million
- Commercial unitary air conditioners: $35 million
- Association costs for regulatory participation: $23 million

For the period from 2013 through 2015, it is expected that residential and commercial HVAC equipment manufacturers will have industry-wide additional total costs of:

- $20 million for monitoring and participating in the regulatory process
- $10 million for duplicate reporting requirements
- $10 million in association costs for regulatory participation

Reporting and compliance could be $10-15 million per year higher industry-wide if the current DOE proposals for commercial equipment remain in place.

The single greatest factor in these costs was the requirement to redesign air conditioners and heat pumps twice in a four year period, once to meet 2006 minimum efficiency standards (the “13 SEER Standard”) and then once again to

eliminate the use of HCFC R-22 in 2010. The change of refrigerant or the 13 SEER requirement led to larger indoor coils and forced some manufacturers to redesign furnaces and other indoor air handing units to make them shorter. Combined, the total cost of the extra redesign was $140+ million for both design and initial compliance testing, excluding any capital investments in tooling or plant capacity.

Because of the major impact energy and environmental regulations have on their businesses, manufacturers must spend considerable time and effort to monitor and participate in the regulatory process. The total of these costs directly to manufacturers from 2006 through early 2013 have been approximately $36 million. In addition, the Air-Conditioning, Heating and Refrigeration Institute (AHRI), the industry trade association, spends approximately $3.3 million per year on regulatory monitoring and participation, for an additional $23 million that manufacturers must support through dues, leading to a grand total of $59 million.

The cost of participating in the regulatory process varies by the amount of time and effort required by manufacturers. The total cost to all manufacturers is approximately $300 thousand whenever DOE or another agency issues a notice or other action requiring consideration and interpretation, $500 thousand for each request for information and $175 thousand to monitor and interpret rules when they are issued in draft or final form.

Based on announced and anticipated DOE activities from the second quarter of 2013 through 2015, the cost of monitoring and participating in the standards processes will be nearly $30 million for manufacturers, or approximately $10 million per year. This compares with $36 million for 2006 through early 2013, or just over $5 million per year. The cost of monitoring and participating in the regulatory process accelerated in 2010 and remains high.

Lack of coordination in reporting standards and testing requirements between various government agencies creates a need for additional tests and for separate record keeping and reporting systems. The annual costs for these additional reporting requirements were $3-4 million per year, or a total of approximately $25 million during the period from 2006 through early 2013. These costs will continue at these levels through 2015 for a total additional cost of $10 million.

The principal direct cause of these regulatory-related costs is a lack of coordination of regulations and reporting requirements between government agencies. It has not been within the scope of this study to understand why this lack of coordination occurred of whether it is avoidable. Whatever the underlying causes, the results have been an increased burden to manufacturers of $250 million. As documented in manufacturer interviews, these costs displace resources for additional research and development.

Regulatory Framework and Cost Elements

Manufacturers of heating and air conditioning equipment are subject to energy and environmental regulations that are distinct from and in addition to the regulations affecting the normal course of all manufacturing businesses. The principal energy and environmental regulation families include:

- Minimum appliance efficiency standards and related testing and enforcement procedures, administered by the US Department of Energy (DOE)
- Energy Star ratings and associated testing and enforcement procedures, administered by the US Environmental Protection Agency (EPA)
- EnergyGuide energy use labels administered by the US Federal Trade Commission (FTC)
- Refrigerant controls administered by the EPA

The costs to manufacturers of these regulations include:

- Monitoring the regulatory process
- Participating in the development of regulations
- Designing products to meet any new regulatory requirements (including product design-related testing, plant conversion, market introduction and other costs related to a new product)
- Testing, labeling and reporting to assure compliance with regulations

Some of these are real incremental cash costs, some involve diversion of staff time to regulatory matters and some are part of the normal course of business in new product development cycles.[1]

Some of the costs arise from real policy differences. For example, the cost of designing a new product can be driven by the engineering difficulty in meeting a new standard level. Or the cost of testing and compliance can reflect different visions on how much verification is necessary. Other costs are related to how each of the energy and environmental programs is managed. Again, overlapping standards and programs between government agencies can force more frequent product redesigns or duplicative reporting processes. While some of the costs based on policy differences are unavoidable, the costs from program management can, in principle, be controlled.

How the federal government manages these energy and environmental programs has a significant bearing on the total costs to the manufacturers of heating and air conditioning equipment. It is in the interest of all parties (the federal government, consumers, energy advocates, consumer protection groups, manufacturers, distributors, contractors, etc.) to minimize the costs of the programs for each party.

[1] In measuring the effects of DOE and related regulatory actions on the heating and air conditioning industry, this analysis counts all costs related to energy and environmental regulation as incremental. Other operating costs, such as normal product design cycles or non-energy and environmental regulations, are considered normal costs of doing business.

There is no benefit to anyone for any other party to have unnecessary costs. This simply produces waste that is, ultimately, born by consumers, taxpayers and funders of environmental advocacy groups. Operating the regulatory programs efficiently will save money for each group. In order to do this, it is necessary to understand how the programs create costs for each group. The purpose of this paper is to define how the regulatory process creates costs for heating and air conditioning equipment manufacturers.

Structure of the Analysis

Regulations generally take place with regard to types of products and so a product-by-product analysis is a simple way to understand the costs borne by manufacturers. Individual firms have different portfolios of products, so each individual firm participates in some combination of each product type. Thus, this analysis looks at the costs to a sub-industry as a whole rather than at the costs for any one individual company. The process included surveying manufacturers to understand the activities they undertake in the regulatory process,[2] what those activities cost and whether the manufacturers use internal or external resources. Some, but few, of the activities scale with volume (for example, larger manufacturers tend to have broader product lines, increasing product development and testing costs but all manufacturers regardless of size have to meet standards as well as labeling, compliance and reporting requirements). So most regulatory activities do not have substantial scale effects. This can put extra burden on smaller companies.

The product types include:

- Residential central air conditioners and heat pumps
- Residential furnaces
- Commercial unitary air conditioners and related equipment

A wide variety of other products are covered by similar sets of regulations and the manufacturers face similar costs. This study is limited to heating and air conditioning equipment.

Residential Central Air Conditioners and Heat Pumps

Since 2006, the effective date of the last set of minimum efficiency standards for residential central air conditioners and heat pumps, central air conditioners and heat pumps have undergone a series of regulatory and enforcement-related proceedings including:

- Phase out of HCFC refrigerants (R22) in 2010, requiring a complete redesign of air conditioners and heat pumps

[2] The survey document is in Appendix A. Actual responses by companies and the number and identities of companies responding are confidential for competitive reasons.

- Allowance by EPA of an HCFC R-22 loophole, which permitted the continuance of the production of "dry" or nitrogen-charged condensing units, thus creating a situation where manufacturers carried duplicative inventories of both the new R-410a product, as well as the old designs, which use R-22 refrigerant.
- Multiple requests for comment by DOE on rating dry R-22 units
- Modification of test procedures effective in 2008 with modifications for off-mode and regional conditions initiated in 2010 and still under development
- Request for comment by DOE on regulating residential air conditioning systems at the component level
- Development of new energy efficiency standards defined in 2011 and effective in 2015 to increase efficiency, set regional variations and include off-mode considerations
- Modification of new EnergyGuide labels to support regional efficiency standards introduced in 2011 and effective in 2015
- Changes in compliance and verification testing procedures including testing standards and the use of models as a substitute for testing discussed and developed from 2011 through into 2013. This has included federal retesting to check on industry verification programs and expanded enforcement.

In total, the costs to the manufacturers of residential air conditioners and heat pumps in order to monitor and comply with these regulations and standards has been $140 million over and above the normal product design cycle costs and the general costs of doing business (Table 1).

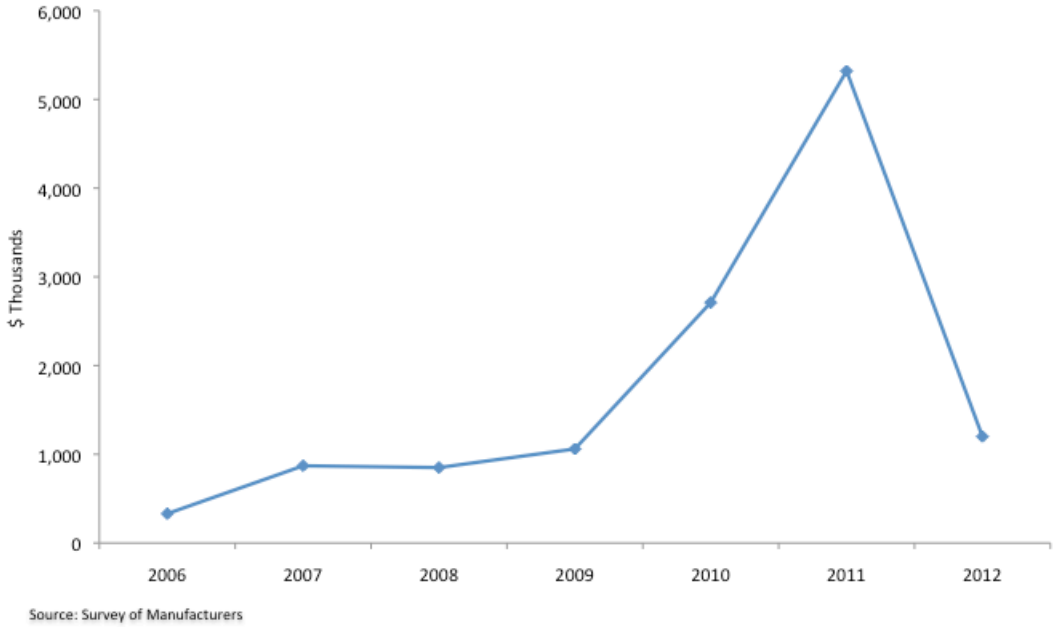
Table 1: Costs of Regulations for Residential Air Conditioner and Heat Pump Manufacturers (2006 – Q1 2013)

	Monitoring & Participating	Designing	Complying	Total
HCFC Phase Out	$2.8 Million	$100+ Million		$100+ Million
Test Procedures	$3.8 Million		$20 Million	$23.8 Million
Standards	$3.7 Million	TBD for 2015		$3.7 Million
Labels	$2.1 Million			$2.1 Million
Compliance Procedures	$3.0 Million		$6 Million	$9.0 Million
Total	$15.4 Million	$100+ Million	$26 Million	$140+ Million

Monitoring and Participating

The costs of monitoring and participating in the regulatory process for air conditioning and heat pump products has tended to average approximately $1 million per year for the manufacturers of residential air conditioners and heat pumps from 2006 through 2009. This cost increased dramatically to over $5 million in 2011 because of the number of regulatory actions and initiatives compressed into the 2009-2012 time period (Figure 1).[3]

Figure 1: Costs to Monitor and Participate in Regulatory Processes
Residential Air Conditioner and Heat Pump Manufacturers



Source: Survey of Manufacturers

In addition to the financial costs, participating in and responding to multiple regulatory topics diverts staff to focus on regulatory activities and away from normal job functions. This is particularly true of more senior personnel with the experience to understand the implications of regulatory proposals. For example, one manufacturer reports that responding to regulatory filings involves a *"combined effort from our staff in industry relations, engineering, marketing and legal. There can be multiple individuals from each function involved depending on the specific issue involved."* As a result *"engineering and marketing resources are diverted from new product development activities. This resource reallocation slows the introduction of products targeted at delivering more value to customers."* Another reports that, in response to a new regulatory filing *"the following group is typically notified and*

[3] These are the costs reported by a sample of manufacturers for monitoring and participation activities allocated to air conditioner and heat pump regulations. The total cost to companies would include similar costs for other products. This also excludes the costs incurred by the Air Conditioning Heating and Refrigeration Institute (AHRI) on behalf of its members, costs that are passed onto the member in dues.

reviews the issues, the amount of time and effort spent depends on the extent of the regulation:

1. *CEO*
2. *CFO*
3. *Sr. VP Marketing*
4. *Sr. VP, Secretary & General Counsel*
5. *Sr. VP Engineering*
6. *Sr. VP Operations/Global Supply Chain*
7. *Director of Regulatory Affairs*
8. *Managers/Directors of Engineering*
9. *Marketing Product Managers*

As a result the following activities may typically be affected by the time put into monitoring and analyzing:

1. *New product development plans*
2. *Business growth plans*
3. *Business improvement plans"*

Other responses from manufacturers were similar.

Manufacturers estimate that the costs to them of participating in the regulatory process are essentially the same either if the process involves a standard approach to rule making or a negotiation between parties. While there are many advantages to the negotiated approach, the time and effort faced by manufacturers are not substantially different. In either case, there are significant demands on the time of both senior management and technical staff.

The regulatory burst in 2010-2012 put a significant burden on the residential air conditioner and heat pump manufacturers to divert cash and human resources to regulatory matters. A smoother pattern of regulations and a more coordinated approach between and within agencies would allow for more efficient and effective use of economic and human resources.

Designing

Product design is one of the most critical activities undertaken by air conditioner and heat pump manufacturers. It sets the product configuration, the material and labor costs and the performance characteristics (energy and other) for the manufacturer's new product offerings. In addition, any significant changes in product design almost always entail changes in parts supply and in manufacturing plant layout and tooling. The implications on investment in engineering time, testing, marketing support and plant investment are substantial. It is critical to manufacturers that they only have to undergo product design programs on a well-planed and coordinated basis. Manufacturers go through a product cycle in a 5-7 year time period absent any standards or other factors, so accelerating that cycle creates additional cost for the manufacturers. Working with that cycle may create additional product design costs if the standards or other regulations force major

technology change (such as a change in refrigerant), but the net incremental cost beyond the normal cost of doing business is much smaller.

The cost of product design in response to a major change in product configuration or technology, such as the switch to 13 SEER products in 2006 or the switch of refrigerants in 2009, is substantial. Each manufacturer that does its own significant product development incurs design and development costs (excluding associated testing and plant investment) of several million dollars. The exact amount of investment by any particular manufacturer depends on its individual product development strategy and the size and breadth of its product lines. Estimates of the total costs to all manufacturers of such a change are more than $100 million, although the precise levels of cost by manufacturer are highly proprietary and cannot be published.

Manufacturers report that they incurred costs at this level for each of the 2006 standard and 2009 refrigerant redesigns. Absence of coordination between these two regulatory requirements, therefore, cost the air conditioner and heat pump manufacturers an incremental $100 million beyond what would have been incurred as part of the normal course of business.

In addition to these 2006 and 2009 standards, there are now new standards that will go into effect in 2015 necessitating additional investments of $100 million or more between now and 2015. The 2015 standards were originally set in 2006, providing a long lead time for the design effort and to recover the embedded design and tooling costs for the 2006 and 2009 standards. However, these were modified in 2011 to raise the heat pump efficiencies, add a regional standard and measure "off-mode" performance (for which the test procedures still have not been determined). Further, DOE has announced the intention to consider separate standards for "outdoor" units of air conditioners and heat pumps in addition to the standard for the total combination of outdoor and indoor portions. These proposals could, if not coordinated in a timely manner, create an additional round of design and design investment, yielding yet another incremental cost level of $100 million plus.

Beyond the issue of costs, time is a significant factor in the product design process. It takes 2-4 years to design, test and introduce a new product. The more significant the change, the longer the time cycle not only for product design reasons but also to perform all other aspects of product introduction as well as to stock the distribution channel and train distributor/wholesalers and installing contractors. One manufacturer describes its own work beyond engineering and also the requirements on suppliers and distribution partners as:

- *Impact on Internal Departments*
    - *Marketing*
        - *Resources are reallocated and stretched thin, when unplanned activities occur,*
        - *New product brochures and marketing collateral must be printed,*

        - *New promotions are developed*
        - *Advertising (print and web) must be adjusted.*
    - *Technical Services Department*
        - *New training materials must be developed, printed and distributed.*
        - *New catalog numbers must be created, which increases the chance of dead or slow moving inventory.*
    - *Training Department*
        - *Must change training materials and ensure customers and sales representatives understand the changes to products and regulations.*
    - *Sourcing Department*
        - *Must react to new product specifications with new specifications for new subcomponents.*
    - *Parts Department*
        - *Must order and stock new parts.*
        - *Part numbers must be created, new part catalogs must be printed and online catalogs must be updated.*
- *Impact on Wholesalers/Distributors and Contractors*
    - *Printing*
        - *New product catalogs*
        - *New catalog numbers*
    - *Administrative*
        - *Must become familiarized with new listings in AHRI*
        - *New part numbers*
        - *Stock new (and old) parts for installation and repair*
    - *Training*
        - *Contractors must train technicians and sales associates on new equipment specifications and features*
        - *Contractors must train sales associates on any rebates (Federal, State and Local) that may be available to pass along to consumers*
- *Impact on Suppliers*
    - *Downstream suppliers must create new product components, assemblies, sub-assemblies and parts.*
    - *These first-level suppliers need to work with their own suppliers for any materials, parts or sub-components, which often need to be tested and certified.*

It is difficult for manufacturers to shorten this lead-time in any significant manner. To the extent it is possible to shorten the development cycle, doing so increases costs because the manufacturer must choose to pursue multiple development options in parallel rather than working on the most promising options and then trying others as necessary. Compressed time does not permit experimenting. If it is

possible to shorten the development time, this comes at a cost increase of approximately 10% per month.

Complying

Any set of standards or regulations needs some form of compliance mechanism. For residential air conditioners and heat pumps, this consists of testing and other protocols to demonstrate initial compliance with standards, reporting and monitoring of continuing compliance with the protocols and follow-up testing for enforcement. The manufacturers themselves recognized the need for such a system and created one through their trade association (AHRI and its predecessors) long before there were federal efficiency or other standards. The AHRI system, thus, became the base-line cost of doing business for the manufacturers. Any additional procedures and activities beyond the AHRI program represent added costs brought on as a result of regulatory and other programs. These costs may meet some public need, but they remain an incremental cost of doing business driven by regulations.

The basic set of processes in assuring compliance is:

1. Testing equipment during the design process to be sure that it will meet standards. Typically this testing process covers some combination of products and is augmented by computer models for other combinations.
2. Periodic testing of production products by independent laboratories to assure continued compliance
3. Reporting of testing results and continued compliance to various organizations
4. Responding to challenges of compliance

Under the traditional AHRI certification process, manufacturers must have third-party tests of 20% of their basic models[4] (similar product designs) prior to listing or selling the product accompanied by annual testing of 20% of the basic model combinations. This amounts to 75-100 units for many manufacturers in the initial certification process and 50-75 units per year. In addition, the manufacturer itself must either test all of its units or have a certified engineering program to determine expected operating results. If all combinations of indoor and outdoor units required physical testing, the number of combinations for residential products easily reaches into the tens thousands for most manufacturers.

In addition to testing for certification under the AHRI program, manufacturers must also perform testing to assure compliance with other regulations. One manufacturer reports:

> *In order to sell throughout North America, our residential products must comply with multiple standards. These standards include Federal energy and*

[4] A "basic model" is a product family with essentially the same energy characteristics but with some different features. For example, a company can have from five to eighty individual products for a single "basic model" residential air conditioner or heat pump.

related standards (from DOE, EPA and FTC), the National Electric Code (NEC), UL1995 safety standards, AHRI standards, California Title 24 standards as well as numerous state and local standards and building codes. These multiple standards do increase the amount of testing required on a regular basis even when one of them changes. For example, product changes required to meet changes in DOE standards require additional testing to demonstrate that products continue to be in compliance to UL1995.

Following the testing process, manufacturers must submit reports or other documentation to various regulatory or other bodies including AHRI for its certification program, DOE for standards certification, EPA for Energy Star qualified products, FTC for labels, among others. As of now, these reports or submittals are not coordinated so that each manufacturer must make separate submissions to each body.

The total cost of testing and submittals for residential air conditioners and heat pumps is approximately $20 million for initial testing of a new product design to demonstrate initial compliance. The annual cost of testing to demonstrate continuing compliance is $7-10 million per year including internal costs and fees to AHRI for its certification program. The cost of recordkeeping and managing submittals is $2-3 million per year. Thus the total continuing costs under the current approaches are approximately $9-13 million per year. Of this, approximately $1-2 million annually is due to overlapping or uncoordinated programs requiring different tests or submittals. Given that there was an extra round of product designs in the period from 2006-2015 due to the HCFC R-22 phase-out, the manufacturers incurred an addition cost of $20 million for that additional initial product certification and testing.

The DOE has recently changed some of its practices in dealing with certification and enforcement questions. Instead of initiating informal inquiries if there seems to be a problem with a product or a set of data, DOE has begun to send formal subpoena notices to answer otherwise routine questions. This has led to situations where manufacturers have needed to respond to DOE enforcement actions to prove that models are within compliance. The cost for such actions, often requiring manufacturers to retain outside legal counsel given the heavy DOE legal approach, has been on the order of $15,000 to $35,000 per manufacturer for any individual residential product.

In addition, DOE is proposing to change the testing and other approaches for certifying compliance with its regulations. These changes could increase the testing burden by increasing the number of units that need to be tested for each “basic model” and by restricting the ability to use computer simulations rather than testing to establish compliance. The exact nature of these potential changes is still under discussion.

Furnaces

Residential furnaces have been the subject of efficiency rulemakings by DOE as well as changes in test procedures, compliance requirements, and Energy Star classification changes. In addition, the 13 SEER air conditioner standard and the phase out of HCFC R-22 had a ripple effect causing some manufacturers to redesign their furnaces. The total costs of these regulatory actions, over the normal costs of doing business, have been over $50 million since 2006 (Table 2).

Table 2: Costs of Regulations for Residential Furnace Manufacturers (2006 – Q1 2013)

	Monitoring & Participating	Designing	Complying	Total
HCFC Phase Out		$25+ Million		$25+ Million
Test Procedures	$3.1 Million		$8.0 Million	$11.1 Million
Standards	$3.6 Million			$3.6 Million
Labels	$2.1 Million			$2.1 Million
Compliance Procedures	$1.0 Million		$6.0 Million	$7.0 Million
Total	$9.8 Million	$25+ Million	$14.0 Million	$50+ Million

The largest portion of this cost was due to the product redesign costs as a secondary consequence of air conditioner standards. At the current time, regional efficiency standards adopted by DOE as part of a consensus process are open for re-analysis. A change in these standard levels could cause an additional furnace product redesign, increasing the cumulative costs associated with regulatory actions.

Monitoring and Participating

The DOE agenda for furnaces since 2006 has included efficiency requirements and testing procedures for furnaces as well as for furnace components:

- DOE set minimum efficiency standards for furnaces with regional and with off-mode/standby requirements, initiated as two rulemakings in 2008 and 2009 and with effective dates in 2013. The regional standard consensus agreement has now been withdrawn by DOE due to a lawsuit and is under reconsideration.
- DOE revised test procedures to include off-mode and standby power consumption, initiated in 2009 and effective in 2010.
- DOE initiated a rulemaking process for test procedures and standards for furnace fans (essentially the electricity consumptions of all air handling equipment with heating capability and including furnaces) in 2012 with no effective date yet.
- EPA phased out the use of HCFC R-22 and DOE set a 13 SEER standard for air conditioners with the effect that some furnaces needed to be redesigned to a

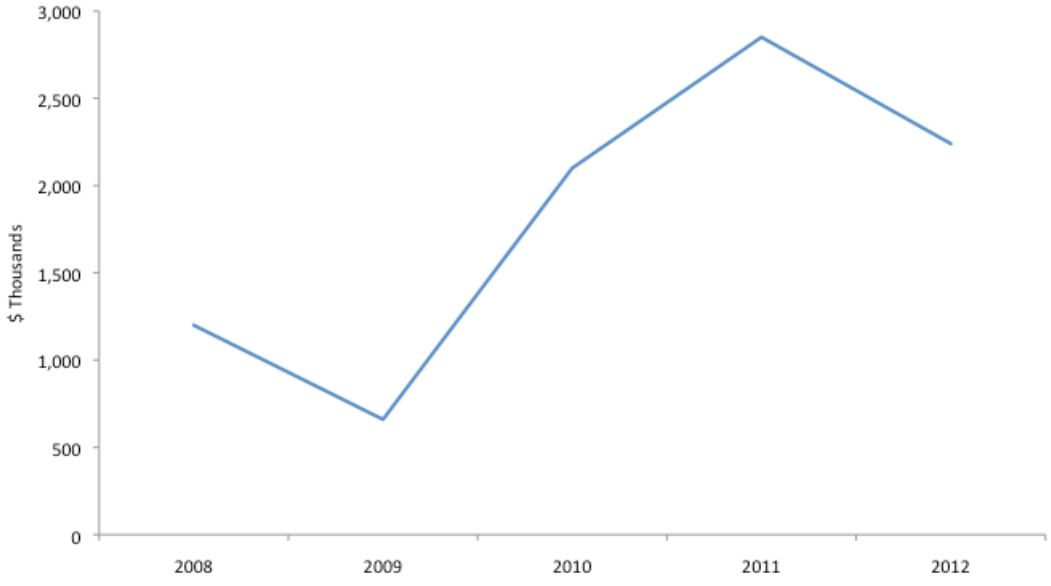
lower height in order to accommodate larger air conditioner evaporator coils.

- EPA updated Energy Star requirements, effective in 2012, to include regional efficiency levels and fan energy maximums.
- The FTC modified its labeling for furnaces to include the regional efficiency levels but held implementation until the DOE regional standards are resolved.
- DOE changed its testing and compliance procedures for all residential products in 2012

The cost to furnace manufacturers of monitoring and participating in these activities has been just under $10 million from 2006 through the beginning of 2013.

Because of the concentration of activities in the 2010-2012 period, the costs to manufacturers spiked during those years (Figure 2):

Figure 2: Costs to Monitor and Participate in Regulatory Processes
Residential Furnace Manufacturers



Source: Survey of Manufacturers

The process leading to the regional minimum efficiency standards was based upon consensus negotiations between manufacturers and other interested parties. While this approach did not have a material effect on the cost to manufacturers, it is generally a preferable one. However, the process was overturned by a lawsuit. As a result, the costs to manufacturers will increase as the regional efficiency standard process is re-initiated in 2013.

Designing

The only actual DOE standards that have come into effect for furnaces in the period since 2006 are for standby mode electric power consumption, due to come into effect in May 2013 and a minor increase in efficiency from 78 to 80%. These requirements, for most manufacturers, do not require a major redesign of furnaces. Many, but not all, furnace manufacturers have had to redesign their furnaces as a consequence of air conditioner standards, redesigns that had no effect on furnace efficiency and were extraneous to the normal furnace design cycle. Meeting the 13 SEER air conditioner standard typically required larger coils for both the indoor and the outdoor units in an air conditioner. Depending on the original cabinet and other characteristic for a furnace, the need for larger coils forced some manufacturers to redesign their furnaces into smaller units so that the combination of the furnace, the indoor air conditioner coil and the associated duct work would fit into a typical indoor utility space. Changing from R-22 to R-410A refrigerant involves operations at higher pressures that also caused some manufacturers to redesign furnace units to accommodate different coils and other components. Redesigns for either or both of these air conditioner related factors were incremental actions unrelated to normal product development and to furnace efficiency. The total engineering cost to the industry for this redesign process was approximately $25 million, excluding any related capital expenditures.

Complying

The situation for furnaces is virtually identical to that for residential air conditioners and heat pumps. AHRI and its predecessors have maintained a testing and certification program for years. Recently DOE is proposing to change the number of required tests and various other aspects of the certification process. There are also disconnects in reporting between AHRI, DOE, EPA and FTC for their various certification programs. Finally, any extra product redesign that occurred as a result of air conditioner changes added an additional round of initial compliance testing.

There are, in total, approximately 75% as many basic furnace models as there are residential air conditioner and heat pump models. Therefore, the total industry-wide cost of testing and submittals for furnaces is somewhat lower than for air conditioners and heat pumps, approximately $8 million for initial testing of a new product design to demonstrate initial compliance. The annual industry-wide cost of testing to demonstrate continuing compliance is $6-8 million per year including internal costs and fees to AHRI for its certification program. The industry-wide cost of recordkeeping and managing submittals is similar to air conditioners and heat pumps as this these activities are not related to the number of models or units – $2-3 million per year. Thus the total continuing costs for all manufacturers under the current approaches are approximately $8-11 million per year. Of this, approximately $1-2 million annually is due to overlapping or uncoordinated programs requiring different tests or submittals. Given that there was an extra

round of product designs for some manufacturers in the period from 2006-2013 due to air conditioner standards, the manufacturers incurred an addition cost of $8 million for that additional initial product certification and testing.

Commercial Unitary Air Conditioners & Related Equipment

The regulatory process for commercial unitary air conditioners and related equipment covers multiple equipment capacities and equipment types. Some of the products are, essentially, extensions of residential air conditioners and heat pumps. Some are similar technologies but in different configurations and larger capacities (so called small, large and very large packaged units)[5] In addition, there are technology variations in how heat is dissipated in the cooling process (air, water or evaporative cooling) and there is a range of specialty products. The complexity of product configurations, sizes and technologies has led to a different regulatory structure than for home appliances, residential air conditioners and heat pumps and furnaces.

Commercial heating and cooling equipment has been covered by a set of consensus-based standards produced by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) as Standard 90.1 and its predecessor Standard 90. These have set minimum heating and cooling equipment standards since the initial adoption of ASHRAE 90 in 1975. The DOE standard setting process is designed to use the ASHRAE standards as the model and to adjust the federal standards congruently with changes in those from ASHRAE. The intention is to base the federal standard on the ASHRAE efficiency levels and testing approaches under most circumstances. The most recent updates of the AHSRAE 90.1 standards came in 2004, 2007 and 2010 and these have been the foundation for the DOE regulatory process in subsequent years.

The total cost to manufacturers of monitoring and participating, designing and complying with these regulations as well as EPA requirements for HCFC R-22 phase out and Energy Star labeling has been $34 million from 2006 to the first quarter of 2013 (Table 3).

[5] Most residential air conditioners and heat pumps are “split systems”, the compressor unit is outside the house and the fan is inside. For regulatory purposes, commercial equipment is “packaged”; all of the components are in one box.

Table 3: Costs of Regulations for Commercial Air Conditioner and Related Equipment Manufacturers (2006 – Q1 2013)

	Monitoring & Participating	Designing	Complying	Total
HCFC Phase Out	$2.1 Million			$2.1 Million
Test Procedures	$2.1 Million		$10 Million	$12.1 Million
Standards	$1.6 Million	$10 Million		$11.6 Million
Labels	$2.1 Million			$2.1 Million
Compliance Procedures	$3.5 Million		$2.5 Million	$6.0 Million
Total	$11.4 Million	$10 Million	$12.5 Million	$33.9 Million

Monitoring and Participating

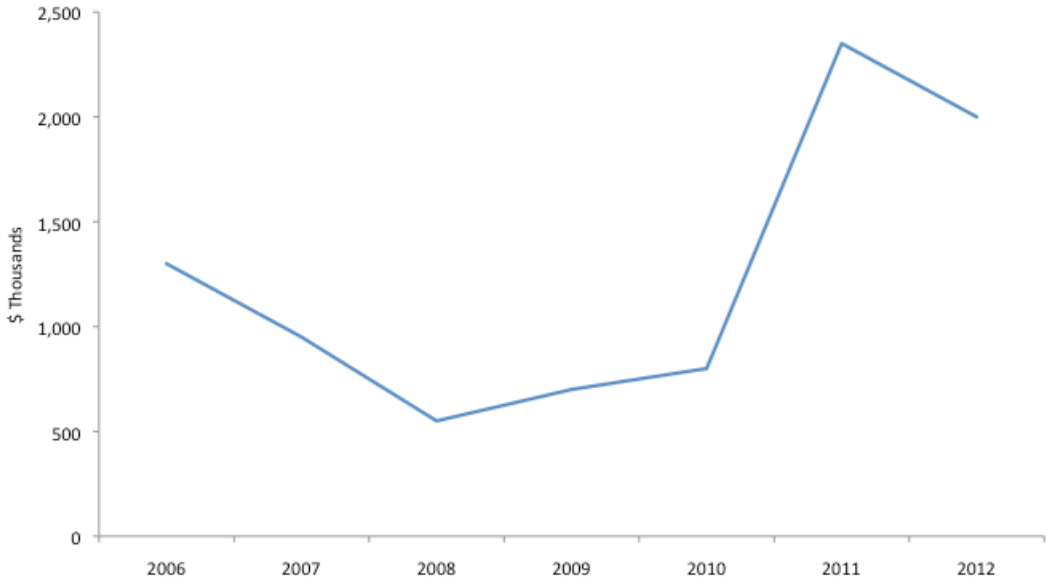
The DOE agenda since 2006 for commercial equipment has been driven largely by statutory requirements and by the need to conform the federal regulations to the ASHRAE standards. The EPA phase-out of HCFC R-22 and the prohibition of manufacturing pre-charged products containing HCFC R-22 in 2010 have affected the commercial air conditioning and heat pump manufacturers as they have the manufacturers of residential equipment. In addition, DOE has proposed new testing and certification requirements that will substantially change the current testing and certification process.

In total, these actions have cost commercial air conditioner and related equipment manufacturers approximately $11 million in order to monitor and participate in the process. This is slightly lower than for residential air conditioners and heat pumps because the standard setting process draws more directly on ASHRAE efforts. These costs do not include the costs of participating in the ASHRAE consensus process, which largely occurred prior to 2006. However, the broader range of specialty products increases the number of manufacturers and their costs while the smaller revenue levels for most products means that the costs are a larger percentage of total revenues[6].

Regulatory activity was relatively high in 2006 due to initial activities on standards, testing, compliance and HCFC phase out. Activity declined from 2007 through 2010 and then increased with standards efforts to incorporate changes from ASHRAE 90.1 in 2007 and 2010. In addition, there was a significant increase in activity on testing and certification, which continues and is likely to increase above first quarter 2013 levels through an additional consensus process recently started by DOE (Figure 3):

[6] Commercial unitary air conditioner revenues are approximately 40% of residential air conditioner and heat pump revenues (Source: Current Industrial Report MA333M - Refrigeration, Air Conditioning, and Warm Air Heating Equipment)

Figure 3: Costs to Monitor and Participate in Regulatory Processes
Commercial Air Conditioner and Related Equipment Manufacturers



Source: Survey of Manufacturers

The commercial air conditioning sector contains many manufacturers of specialty products who have limited revenues in this arena (some may be portions of larger companies but the resources available for participating in regulatory activities remain limited). As such, these companies have both constrained budgets and small technical staffs who have little time available for participation in regulatory activities.

Designing

The cost of designing equipment to meet DOE, EPA and other energy and environmental standards has not been a significant incremental burden on commercial air conditioner and related equipment manufacturers in the period from 2006 through 2012. Coincidentally the normal product cycles, ASHRAE/DOE regulatory cycles and the HCFC phase out have been in synchronicity with each other during this period. The HCFC phase out in 2010 came at the same time as the effective date of several ASHRAE standard levels and preceded others by a year. While the cost of redesigning equipment for HCFC phase out approached $100 million for the industry as a whole, this generally could be incorporated within the normal design cycle. There is some fall-out of the regulatory process that causes redesign of products not covered by DOE standards that, for commercial reasons, need to be coordinated with the covered products. This added design cost was approximately $10 million.

While it is not possible to quantify, the more significant issue in the design process for commercial unitary and related air conditioning equipment is the diversion of engineering resources from product features to energy efficiency and HCFC phase

out. This effect is true across all types of equipment, and is particularly noticeable in commercial equipment because of the inability to afford design time given the more limited revenue levels. In addition, the commercial sector has a wider range of customization in the products sold, with more actual options for product features (many of which would save energy).

Additionally, DOE has announced potential rulemakings on both commercial cooling and commercial heating products – if these are not coordinated well, design changes required by one mode could affect the performance of the other mode, causing either two rounds of design changes or not correctly analyzing the cost of the product changes for compliance.

Complying

The major issue during the period from 2016 through 2013 for manufacturers of commercial air conditioners and related equipment has been the process (and, thus, the cost) of demonstrating compliance with energy and environmental regulations. Traditionally, commercial air conditioning equipment was tested and certified through the industry-sponsored program operated by AHRI. This set testing levels for basic equipment configurations and included a range of product customization without the need for additional testing. Since most commercial air conditioning equipment is specified for a specific project and includes an individualized set of options, this testing and certification program accommodated the realities of production.

DOE is proposing to substitute a new set of testing and compliance procedures for the traditional AHRI program. In the proposals adopted to date (but currently with implementation on hold), the definition of a basic model is tightened in such a way that the number of basic models produced by a manufacturer will increase exponentially. For example, one manufacturer estimates that the number of basic models of commercial air conditioners and heat pumps it produces will expand from under one hundred to, theoretically, millions or more. Potentially, each equipment order will be an individual model (or several) and will require individual testing. In some cases, a requirement to test two units would exceed the number ordered and produced. The total costs of such a requirement would be $10-15 million per year and, moreover, would place significant delays on shipments of products while they await testing.

As a partial alternative to this testing regime, DOE is proposing that manufacturers could adopt Alternative Efficiency Determination Methods (AEDMs) in order to determine the energy consumption of commercial air conditioning equipment. While some manufacturers have AEDMs at the current time, most will need to develop them. The total cost for developing such AEDMs, including internal time and external software support will be $2-3 million.

Future Costs

Based on the statutory requirements and DOE's announced plans, the cost of monitoring and participating in the development of future regulations will total approximately $30 million from the second quarter of 2013 through 2015 (Table 4)[7]:

Table 4: Projected Future Costs for Monitoring and Participating in Standards Activities (Q2 2013 through 2015)

Program	Estimated Cost
Residential Central Air Conditioners and Heat Pumps	
Off-Mode Test Procedures	$2.4 million
Furnaces	
Condensing AFUE Test Procedure	$2.4 million
Furnace Fan Test Procedure	$2.4 million
Regional Furnace Standards	$2.1 million
Furnace Fan Standards	$2.1 million
Furnace Labels	$1.5 million
Furnace Fan Labels	$1.5 million
Total	$12.0 million
Commercial Unitary Air Conditioners	
IEER Test Procedure	$2.4 million
Commercial Furnace Test Procedure	$2.4 million
IEER Standards	$2.1 million
Commercial Furnace Standards	$2.1 million
ASHRAE 90.1-2013 Related Standards	$2.1 million
Compliance Process Review	$2.1 million
Commercial Product Labeling	$1.5 million
Total	$14.7 million
Grand Total	$29.1 million

This compares to approximately $36 million for the period from 2006 through the first quarter of 2013, for a total of $71 million over the ten-year period. The balance is shifting with commercial products and furnaces bearing greater costs in the future relative to residential air conditioners and heat pumps (Table 5):

[7] Costs based on the average costs reported by manufacturers for notices, comments and rules and the average number of each type per rulemaking from 2006 through Q1 2013

Table 5: Past and Future Costs of Monitoring and Participating in Standards Activities

Product	2006-Q1 2013	Q2 2013-2015
Residential Central Air Conditioners and Heat Pumps	$15.4 million	$2.4 Million
Furnaces	$9.8 million	$12.0 million
Commercial Unitary Air Conditioners	$11.4 million	$14.7 million
Total	$36.6 million	$29.1 million

Part of the issue for furnaces is the redo of the regional standards as a result of the withdrawal of the consensus standard. The costs for commercial products reflect the greater number of products that are being considered by DOE.

These costs exclude any redesign costs that might occur if any standards are out of sync with normal product lifecycles. The development of furnace fan and furnace standards creates the potential for such out of sync design requirements.

In addition to the monitoring and participation costs, there will continue to be incremental costs for monitoring and compliance activities. The current $3 million per year incremental monitoring and reporting costs incurred across all three product categories will continue until and unless reporting and testing requirements are coordinated between DOE, EPA and the FTC. These monitoring and reporting costs could escalate substantially to an additional $10-15 million per year if the current DOE proposals for commercial equipment go into effect.

Underlying Causes

The purpose of this analysis has been to identify the costs borne by manufacturers of energy and environmental regulations above and beyond the normal costs of doing business. This did not include a determination of the root causes for those costs, nor did it attempt to calculate the added costs to HVACR distributors, contractors or the impact to the end-consumer. However, it is possible to make some observations on several factors that have influence the creation of additional costs:

- Non-administrative directives: topics outside of the control of administrative agencies (DOE, EPA, etc.) such as legislative directives
- Administrative actions: actions by one administrative agency that led to additional costs
- Lack of coordination: absence off coordination between various administrative agencies
- Policy differences: policy choices by a regulator that created costs

There can be interactions between factors and more than one may be involved in any situation. Examples of each of these factors (or combinations of factors) underlie the costs identified in this paper.

Non-Administrative Directives

The spike in activities in the 2010-2012 time frame is largely due to mandates from the Energy Independence and Security Act of 2007 and the American Clean Energy Act of 2009 that contained requirements for new standards on a variety of residential and commercial products. The spike increased the costs of monitoring and participating in the regulatory process. In addition, given the broad involvement of senior management at the manufacturers, such a spike is much harder to accommodate than a steadier flow of activities.

Administrative Actions

In 2009, DOE used a consensus agreement reached by environmental groups, manufacturers and others as the basis for regional furnace standards. This consensus approach has been successful in the past as a way of developing standards. However, in this instance, DOE withdrew the consensus standard in the face of legal action, therefore initiating a new rulemaking process (one whose costs are after the timeframe of this paper). The costs of this second process will be additional ones for manufacturers and others.

Lack of Coordination

As discussed extensively in this paper, the lack of coordination between the DOE 13 SEER standard and the EPA HCFC R-22 phase out with the two requirements occurring within four years of each other, forced the manufacturers to redesign not only air conditioners and heat pumps but also furnaces within a compressed time frame and outside of the normal product design cycle. This created a significant cost for design and testing of $200+ million as well as additional capital expenditures to retool manufacturing capabilities.

Policy Differences

The decision by DOE to change its testing and certification programs has elements of administrative actions that may not be an efficient use of resources. However, the principal issue is an underlying difference on policy choices. DOE has determined that the traditional industry testing, certification and reporting practices are not acceptable and DOE has proposed alternatives. These alternatives may or may not be a useful use of DOE and manufacturer resources but the requirement to undertake the additional testing is a deliberate policy decision.

Appendix A - Cumulative Regulatory Burden - Data Collection

Purpose and Approach

The purpose of this data collection process is to develop quantitative and qualitative data on the burden caused by appliance efficiency and related regulations. We are seeking both a qualitative description of how your firm deals with the regulatory process and quantitative information on the costs of compliance. We have broken down the regulatory process into five parts:

- Monitoring and Analyzing
- Designing for Compliance
- Testing for Compliance
- Certifying and Enforcing
- Other

For each part, we would like to get a brief description of how your firm operates (dedicated staff, staff pulled in from other activities, consultants, outside testing firms, etc.) as well as how much these activities cost. Internal costs should include salaries, fringe benefits, any materials, in the case of engineering or other activities using large amounts of space, the cost of space plus any other costs your company deems relevant. External costs include all costs paid to third-parties. In all cases, we are looking for data that you have reasonably readily at hand and for reasonable estimates.

Confidentiality – all data we receive will be treated as highly confidential and will not be released except in aggregate form to anyone.

Monitoring and Analyzing

The activities in this part relate to dealing with DOE, EPA, FTC, states and other agencies' announcements in terms of monitoring and deciding what to do. The next section on Designing for Compliance covers engineering and other activities to bring your products into compliance with any new standards. The idea is that every time one of the government agencies initiates anything (a NOPR, a revision to an NOPR, a request for data, etc.) it generates activities and costs for manufacturers. These costs could include analyzing the agency's filing, determining its impact, preparing comments, etc.

Questions:

1. How does your firm manage this process?
    a. Who is involved?
    b. What outside resources are required?
    c. What other work is given up to respond?

2. How much does it cost you each time a governmental agency initiates a topic
    a. Where only comments are required?
    b. Where data is required?

Designing for Compliance

The activities in this part cover the actual engineering and new product introduction costs, etc., for designing products that meet any proposed testing requirements, standards, etc. It does not include the costs of testing for compliance, which is covered in the next section. We realize that the immediate answer to this question is "it depends" because the degree of product design effort can be quite variable. That said, it is important to set some parameters around the activities and costs. We also realize that the product complexity and volume differences for residential and commercial equipment may be cause significant differences in the costs. If so, please respond independently for residential and commercial products.

What we are trying to get to is that every time DOE, a state or another agency changes things, it creates a whole set of engineering and other new product introduction activities. Moreover, the closer to the start of the new product process is to the implementation date, the more this costs (expediting is inefficient and expensive). So, for example, if the EnergyStar program changes the level for EnergyStar qualification after the design process starts to meet a new DOE efficiency standard, a manufacturer might have multiple redesign efforts, at least one under a short time frame. We want to understand whether this (or similar) event has occurred and what the cost implications are.

Questions – Residential Equipment:

1. How does your firm manage this process?
    a. Who is involved?
    b. What outside resources are required?
    c. What other work is given up to respond?
2. What does it cost you for a new product design/introduction?
    a. What is the unit of measure that drives the cost (e.g. a product line, a specific model, a family of models, etc.)?
    b. Approximately how much does it cost for the product design through introduction for each unit of measure (i.e. how much does it cost for each product line that you must adapt)?
    c. What is the desired time frame for the product design/introduction process?
    d. How much does the cost change if that process is compressed? Is there some function of time that changes the cost (e.g. for each month the process is compressed, the cost increases by x%)?

Questions – Commercial Equipment:

1. How does your firm manage this process?
    a. Who is involved?
    b. What outside resources are required?
    c. What other work is given up to respond?
2. What does it cost you for a new product design/introduction?
    a. What is the unit of measure that drives the cost (e.g. a product line, a specific model, a family of models, etc.)?
    b. Approximately how much does it cost for the product design through introduction for each unit of measure (i.e. how much does it cost for each product line that you must adapt)?
    c. What is the desired time frame for the product design/introduction process?
    d. How much does the cost change if that process is compressed? Is there some function of time that changes the cost (e.g. for each month the process is compressed, the cost increases by x%)?

Testing for Compliance

The activities in this part cover the testing and other activities necessary to substantiate product performance and demonstrate compliance with DOE or other standards. This area has become more complicated, particularly for commercial equipment, with questions about the definitions of "basic models" and the availability of non-testing approaches (AEDMs and ARMs) as a means of establishing efficiency and performance. This part does not cover the costs related to enforcement after products are manufactured and put into commerce. It does include the costs of maintaining certification data systems and directories.

We recognize that the activities and costs here may be quite different for commercial and for residential equipment. Therefore, we will separate the questions into two groups, one for each type of equipment, in order to focus the discussions.

Questions – Residential Equipment:

1. How does your firm manage this process?
    a. Who is involved?
    b. Is there a dedicated group that focuses on testing for compliance or are these activities part of a more general engineering or other group?
    c. What other work is given up to respond?
    d. Do you use an Alternative Rating Method (ARM) or and Alternative Efficiency Determination Mechanism (AEDM)? Did you develop this?
    e. What outside resources are required for engineering, testing or other activities?
2. What is the magnitude of the testing and compliance process?

a. How many basic models of residential equipment do you produce?
b. How many distinct products are there in total that are covered by these basic models?
c. How many times in the past five years have you had to retest or recertify any or all of your basic models? Why?
d. Are your products covered by multiple standards requiring multiple testing on the same product? How often does this occur?

3. What does it cost you for testing and demonstrating compliance?
    a. What are your internal costs for testing and demonstrating compliance whenever such testing or other methods are required? What do those costs cover?
    b. What are your external costs? What do those costs cover?

Questions – Commercial Equipment:

1. How does your firm manage this process?
    a. Who is involved?
    b. Is there a dedicated group that focuses on testing for compliance or are these activities part of a more general engineering or other group?
    c. What other work is given up to respond?
    d. Do you use an Alternative Rating Method (ARM) or and Alternative Efficiency Determination Mechanism (AEDM)? Did you develop this?
    e. What outside resources are required for engineering, testing or other activities?
2. What is the magnitude of the testing and compliance process?
    a. How many core product platforms (or AHRI basic models) of commercial equipment do you produce?
    b. How many distinct products are there in total that are covered by these basic models (essentially the DOE definition of basic model)?
    c. How many times in the past five years have you had to retest or recertify any or all of your core product platforms? Why?
    d. Are your products covered by multiple standards requiring multiple testing on the same product? How often does this occur?
3. What does it cost you for testing and demonstrating compliance?
    a. What are your internal costs for testing and demonstrating compliance whenever such testing or other methods are required? What do those costs cover?
    b. What are your external costs? What do those costs cover?
    c. Who is involved?

Certifying and Enforcing

The activities in this part cover the post-production timeframe where manufacturers need to keep records certifying compliance with standards and conducting additional testing in the event of questions relative to actual performance versus a standard. We recognize that there is a change underway in this area with DOE substituting new procedures for traditional AHRI certification processes. We are seeking to understand the cost of complying with traditional approaches and also the cost of complying with newer DOE proposals. There seem to be some start-up issues with the DOE procedures where manufacturers have had difficulties with DOE's testing, some of which may be start-up problems for DOE's labs. There may still be additional on-going costs once DOE works out the bugs in its system. We want to understand all three of these sets of costs (traditional approach, DOE start-up issues and expected continuing costs from new DOE procedures).

Questions:

1. How have you conducted certification in the past?
    a. Have you participated in AHRI or other certification programs? Which ones?
    b. How have you managed these activities – who is involved and how much time does it take?
    c. How much does it cost you per certification program, per basic model or other means of measurement?
    d. How much doe it cost you in total?
2. Have you had to retest products for lack of compliance reasons under these traditional certification programs?
    a. How often over the past five years?
    b. How did you manage this?
    c. What did it cost?
3. Are you now covered by new DOE testing and compliance procedures?
    a. For how much of your product line?
    b. Have you had to change the way that you manage this process internally?
    c. Has this changed you internal costs and, if so, by how much?
4. Have you had any products selected for additional testing under the DOE process?
    a. How many instances and what products?
    b. What has been the outcome of this process?
    c. How much did it cost you for any actions that you took related to this review process?
    d. What was the outcome?

Other

Are there other aspects of efficiency related regulatory burden that are not covered here? What are those issues? What have you needed to do with relationship to them? How much has it cost you? Is this a one time or a recurring cost?