US Department of Energy Conservation Standards for Commercial/Industrial Pumps, Fans and Compressors

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Background

The U.S. Department of Energy (US DOE) has authority to set energy conservation standards for commercial and industrial equipment under the Title III Energy Policy and Conservation Act (EPCA) of 1975. The stated purpose of EPCA is to "... to improve the efficiency of electric motors and pumps and certain other industrial equipment in order to conserve the energy resources of the Nation". EPCA list 11 specific types of covered equipment that includes electric motors and pumps. Additionally, the EPCA allows the Secretary of the Department of Energy to identify other industrial equipment that is covered. The EPCA authorizes the DOE to issue standards, test procedures and labeling requirements for covered equipment.

Since 1992, the DOE has promulgated standards on electric motor efficiency that will soon raise the bar on most electric motors from 1 to 500 HP to NEMA Premium efficiency levels.[1][2] Now the DOE is looking at the efficiency of pumps, fans and compressors and has begun the process of developing energy efficiency standards for these industrial equipment types. This whitepaper will discuss the current progress (11/5/14) of rulemaking on industrial pumps, fans and compressors. Proposed covered equipment types in each categories, possible standards, rulemaking methodology and schedule will be discussed. NOTE: This is an assessment of the current status of the rulemaking process. The final rule for each covered equipment will evolve as the process continues.

Rulemaking Process

Through the EPCA, the DOE is directed to develop standards designed to achieve the maximum improvement in energy efficiency that is *technologically feasible* and *economically justified*. The EPCA sets seven factors for analysis that the DOE must consider when setting technologically feasible and economically justified. These seven factors and the corresponding DOE analyses are shown in the table below:

EPCA Requirement	Corresponding DOE Analyses
1. Economic Impact on consumers and manufacturers	• Life-Cycle Cost Analysis • Manufacturing Impact Analysis
2. Lifetime operating cost savings compared to increased equipment cost	• Life-Cycle Cost Analysis
3. Total projected energy savings	• National Impact Analysis
4. Impact on utility performance	• Engineering Analysis • Screening Analysis
5. Impact on any lessening of completion	• National Impact Analysis
6. Need for national energy conservation	• National Impact Analysis
7. Other factors the Secretary considers relevant	• Emissions Analysis • Utility Impact Analysis • Employment Impact Analysis

[1] John Malinowski, Baldor Whitepaper, *U.S. Department of Energy Integral Horsepower Motor Rule*, 11/4/14

[2] John Malinowski, Baldor Whitepaper, *Baldor Electric Position on DOE Small Motor Rule – 10/28/14*

The Energy Conservation Standard (ECS) rulemaking process has a timeline duration of approximately three years from start to finish. The process involves analysis, public notice and comments, consultation with interested parties including manufacturers, consumers, energy conservation non-government agencies (NGO's), environmental advocates, state and federal agencies, and any other group that has an interest in the ECS. The ECS process is a four step process shown below:

At each of the first three steps, the DOE holds public meetings to get comments from the public on the proposed ECS.

The process begins with a **Framework Document** that describes the overall approach the DOE is planning to use to develop the ECS. It discusses the scope of the proposed ECS, equipment definitions, metrics for defining efficiency, and possible test procedures for measuring efficiency of the covered equipment. The Framework Document is presented to the public and opened for comments that are used in the next step, the Preliminary Analysis.

The **Preliminary Analysis** is a discussion of the comments received on the Framework Document and is essentially a public vetting of the proposed models, tools and methodology theDOE intends to use to develop the ECS. Using the proposed tools and models, the DOE will perform a preliminary analysis of covered product to assess possible standard levels for the covered equipment. The Preliminary Analysis is presented to the public and the DOE will accept comments that are used to develop the Notice of Proposed Rule.

The **Notice of Proposed Rule (NOPR)** is developed from comments on the Preliminary Analysis; the DOE's analysis of the impact of the ECS on users, manufacturer and the nation; the DOE's weighing of the impacts; and any proposed standard levels for public comment. This is essential the proposed final rule that the DOE develops, opened for comment.

The **Final Rule** is developed from the NOPR comments and revised analysis. It defines the standard levels for the covered equipment and sets a date that manufacturers must comply with the new ECS.

Industrial Compressors Rulemaking

On 31 Dec 2012, the U.S. DOE issued a Proposed Determination of Coverage for commercial and industrial compressors. In this proposal, the DOE determined that Industrial and Commercial compressors met the criteria of the Energy Policy and Conservation Act and warranted the development of an Energy Conservation Standard. Following a period of public comment, the DOE released the Framework Document for Commercial and Industrial Air Compressors on 24 Jan 2014. The DOE held a public meeting on 3 Mar 2014 to solicit public feedback on the proposed Framework Document. In this Framework Document, the DOE is considering the following attributes for a covered compressor:

- Rotary screw, oil flooded
- Electric motor driven (3-phase)
- 5 – 500 HP

Following public comment on the Framework Document, the DOE is expecting to release their Preliminary Analysis in Dec 2014, the NOPR in Mid 2015 and the Final Rule in Mid 2016 with a projected compliance date of July 2021.

Fans and Blowers Rulemaking

The DOE published the ECS Rulemaking Framework for Commercial and Industrial Fans and Blowers on 28 Jan 2013. A public meeting was held on 21 Feb 2013 and comments were received until 3 Jun 2013. In this Framework Document, the DOE proposed the following characteristics for cover fans:

- Fan Types: All (axial, centrifugal, mixed flow, blowers)
- Impeller diameters up to 98”
- All transmission types
- 1 – 200 HP

Using public comments and data submitted by fan manufacturers, the DOE is developing the preliminary analysis for Fans and Blowers with an expected completion date of late 2014.

Commercial and Industrial Pump Rule Making

The DOE issued a first request for information on 13 Jun 2011 asking for product market data, energy use, test procedures and energy efficient designs for commercial and industrial pumps. This was followed by the release of the ECS Rulemaking Framework for Commercial and Industrial Pumps on 25 Jan 2013. A public meeting was held on 20 Feb 2013 to present the Framework Document with a subsequent comment period that closed on 2 May 2013.

On 23 Jul 2013 the DOE Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) issued a notice to establish a Commercial/Industrial Pumps working group to work on a NOPR for energy conservation standard. The Negotiated Regulation (NEGREG) is a process where a working group consisting of representatives of parties having a defined stake in the outcome of proposed standard work together to negotiate an acceptable outcome. For this working group, there were equal numbers of representatives from Pump OEM’s and Energy Efficiency Advocates as well as industry experts from NEMA and the DOE. This Working Group met seven times between Dec 2013 and Jun 2014 to work on details of a proposed standard for pump energy efficiency. At the end of this process, the working group developed by consensus a Term Sheet[3], which will become the basis for a NOPR. This term sheet defines the covered product:

[3]Appliance Standards and Rulemaking Federal Advisory Committee, *Commercial and Industrial Pumps Working Group*, Term Sheet, June 19, 2014

- Centrifugal pump
    - End Suction close coupled and mounted
    - Inline
    - Radial split multistage vertical
    - Vertical Turbine Submersible
- Electric motor driven, 1800 or 3600 rpm
- 1-200 HP at BEP
- >25 gpm at BEP
- Max 459 ft head at BEP
- Process temperature -10 to 120 C
- 6" or smaller bowl diameter
- Clean water

Additionally, this working group developed Energy Conservation Standards, recommended test procedures as well as performance metrics for the covered pumps.

This Term Sheet will become the basis for the NOPR for Commercial and Industrial Pumps, essentially taking the Rule Making processes through the Preliminary Analysis Step.

Current Status of Rulemaking

The chart below summarizes the current status of DOE rulemaking for Pumps, Fans and Compressors:

Proposed Milestones for Energy Conservation Standard Rulemaking			
	Compressors	**Fans**	**Pumps**
Framework Document	Jan 2014	Jan 2013	Jan 2013
Preliminary Analysis	Nov 2014	Late 2014	Jun 2014 (Replaced by Term Sheet complete)
NOPR	Nov 2015	Q2 2015	Q3 2015
Final Rule	Jul 2016	Q1 2016	Q2 2016
Compliance Date	Jul 2021	Q1 2019	Q2 2019

This white paper will be updated as each of the rulemaking processes continue toward the final rule.

For questions please contact Brent McManis at brent.mcmanis@baldor.abb.com