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June 10, 2022

MEMORANDUM OF EX PARTE COMMUNICATION

Docket: Energy Conservation Standards for Room Air Conditioners, Doc. No. EERE-2014-BT-STD-0059-0031, RIN 1904-AD97, 87 Fed. Reg. 20608 (proposed Apr. 7, 2022).

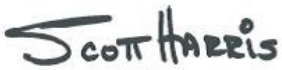
Communication Date: June 7, 2022

***Recipient*:** Shalanda Baker (Secretarial Advisor on Equity and Deputy Director for Energy Justice**)**

***Senders*:** Scott Blake Harris and Stephanie Weiner of Harris, Wiltshire & Grannis LLP, on behalf of Friedrich Air Conditioning Co.

***Summary*:** On behalf of Friedrich Air Conditioning Co., counsel sent the attached correspondence to Shalanda Baker regarding the adverse health and other consequences for low-income families and other marginalized communities that Friedrich believes will result from the Department of Energy's proposed standards for room air conditioners (RACs). Counsel attached Friedrich's comments submitted in EERE-2014-BT-STD-0059-0031.

Submitted By:



Scott Blake Harris

Counsel to Friedrich Air Conditioning Co.

Sarah Sim

From: Scott Blake Harris
Sent: Tuesday, June 7, 2022 10:54 AM
To: shalanda.baker@hq.doe.gov
Cc: Stephanie Weiner
Subject: Energy Justice and Equity Issue
Attachments: Friedrich Air Conditioning Co. Comments EERE 2014 BT STD 0059 June 6 2022.pdf

Ms. Baker –

We represent Friedrich Air Conditioning Company, a large U.S. manufacturer of room air conditioners (RACs). The Department is considering new energy efficiency standards for RACs that **we believe will have adverse health and other consequences for low-income families and other marginalized communities**. Most simply put, the new standards will drive up the costs to purchase RACs – which are the primary source of cooling for low-income families – such that for many they will no longer be affordable. Moreover, due to historic inequities, Black and Latino neighborhoods experience more extreme temperatures than White neighborhoods during heat waves, making affordable cooling options even more essential. As a result, we believe adopting these new standards would conflict with the Administration's goal of addressing environmental injustice and ensuring that systemic inequities are not perpetuated.

I have attached the comments we filed yesterday in the Department's rulemaking proceeding – where we discuss these (and other) issues and cite relevant data. We ask that you and your office take a role in the rulemaking process to ensure that concerns about equity and energy justice are fully addressed.

Please let me know if you have any questions or need additional information.

Best regards.

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BEFORE THE
UNITED STATES DEPARTMENT OF ENERGY
WASHINGTON, DC 20554

In the Matter of Energy Conservation Program: Energy Conservation Standards for Room Air Conditioners	DOE Docket No. EERE-2014-BT-STD-0059

COMMENTS OF FRIEDRICH AIR CONDITIONING

INTRODUCTION

Friedrich Air Conditioning Co. (Friedrich) is an industry leader in residential and commercial room air conditioners (RACs). Established in 1883 in San Antonio, Texas, Friedrich designs RAC solutions for homes, multi-family buildings, hotels, and schools. By 1950, Friedrich had become one of the world's largest manufacturers of commercial refrigeration equipment. Building on its reputation as an industry leader, the company expanded into RACs in 1952—seventy years ago. Headquartered in San Antonio, Friedrich is the sole remaining RAC manufacturer in North America.[1] Accordingly, it submits these comments in response to the Notice of Proposed Rulemaking on Energy Conservation Standards for Room Air Conditioners.[2]

Friedrich has for decades demonstrated its commitment to innovation in RAC technology by making continual improvements in energy efficiency, performance, reliability, durability, and sound reduction. Long ago, Friedrich launched the first RAC with electronic controls, the first heat pump RAC, and the first Wi-Fi enabled smart RAC. Friedrich recently built its state-of-the-art Design and Development Center—including an on-site laboratory—in San Antonio to test the performance of its RACs under a variety of simulated conditions.[3] Many of Friedrich's RACs have smart features like programmable thermostats and remote-management capabilities that both save energy and reduce costs for customers. Today, Friedrich remains one of the most recognized RAC brands, known for innovation, commercial-grade durability, and energy efficiency.[4]

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1 *The Friedrich Legacy*, Friedrich, https://www.friedrich.com/about/company-history (last visited May 22, 2022).

2 U.S. Dep't of Energy, Energy Conservation Standards for Room Air Conditioners, Doc. No. EERE-2014-BT-STD-0059-0031, RIN 1904-AD97, 87 Fed. Reg. 20608 (proposed Apr. 7, 2022).

3 Friedrich Air Conditioning, *Friedrich's Design and Development Center*, YouTube, https://www.youtube.com/watch?v=3dbHchN5mL8 (last visited May 21, 2022).

4 In August 2021, Friedrich was acquired by Rheem Manufacturing Company (Rheem). Rheem, founded in 1925 in Emeryville, California, is one of the largest HVAC and water heating manufacturers in the United States. *Rheem Acquires Friedrich Air Conditioning*, News Releases, Rheem (Aug. 30, 2021), https://www.rheem.com/about/news-releases/rheem-acquires-friedrich-air-conditioning.

Friedrich fully supports increases in energy efficiency standards under the Energy Policy and Conservation Act (EPCA).[5] DOE's new proposed RAC standard, however, fails to meet the EPCA's legal requirements. Specifically, proposed Trial Standard Level (TSL) 3[6] is neither technologically feasible nor economically justified.[7]

Friedrich agrees with the comments filed by the Association of Home Appliance Manufacturers (AHAM) in this proceeding and supports the standards levels urged by AHAM. Friedrich's comments highlight certain issues that Friedrich is particularly well-suited to address, given its extensive experience with RACs and its detailed knowledge of the U.S. market—including the nature of RAC consumers and their purchasing, installation, and use behaviors.

Specifically, DOE's proposed standards are neither technologically feasible nor economically justified because they:

- ***Would have a severe negative impact on low-income families and other marginalized communities;***
- Would require substantial changes in chassis size and weight, making it unfeasible and even dangerous to handle and install units;
- Rely on an overstated calculation of cooling operating hours that does not reflect consumer behavior;
- Do not account for the supply chain impact or the costs to service RACs with variable-speed compressors and increased heat exchanger sizes; and
- Suggest a list of options for increasing RAC efficiency that do not offer any benefit.

DISCUSSION

DOE proposes to set RAC standards at level TSL 3, which for thirteen product classes is far beyond levels currently certified in the U.S. market. There is, then, no real-world evidence that these standards are technologically feasible or economically justified. DOE's conclusion that these standards comport with the EPCA seems to rely on unwarranted speculation. *The truth is that this proposal would harm consumers, particularly low-income families and other marginalized communities that depend on RACs as their main source of cooling*.

1. The Proposal Would Harm Low-Income Families and Marginalized Communities.

As the Department would have to concede, DOE's proposal would increase the cost of RACs. Yet low-income households rely on RACs far more than households with higher incomes. A cost increase for RACs therefore will disproportionately affect poor families. Moreover, due to historic

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5 42 U.S.C.A. § 6291 *et seq.*

6 Table V.58 Proposed Amended Energy Conservation Standards for Room Air Conditioners for TSL 3, 87 Fed. Reg. at 20679.

7 42 U.S.C.A. § 6295(o)(2)(A).

inequities, Black and Latino neighborhoods experience more extreme temperatures than White neighborhoods during heat waves, making affordable cooling options essential. Air conditioning should not be a luxury good. Increasing the cost of RACs may place them out of reach for budget-constrained, low-income households that have suffered historic inequities, leading to a risk of serious, adverse health and other consequences. This would rightly create concerns about energy justice and wrongly place the burden of energy efficiency on underprivileged households.

Low-income families rely on RACs more than higher income families.[8] As DOE has recognized, in its consumer subgroup analysis, low-income households represent 60% of all households for Product Class 1 and 50% of all households for Product Class 2.[9] By contrast, users of central air conditioning systems are generally more affluent.[10] In short, households that use RACs have limited budgets and it is these low-income households that will bear the brunt of any cost increase.

RACs have long been an affordable and accessible technology. DOE's proposal could well change that. Although DOE estimated the impact of the proposed TSLs on low-income households,[11] that analysis fails to acknowledge that some low-income families may choose not to purchase a RAC if the cost, including first cost, increases too much—and thus it cannot support the conclusion that TSL 3 is economically justified. *Simply put, an increase in the cost of RACs could mean that air conditioning is simply out of reach for many low-income families*. The length of the payback period is irrelevant for families that choose not to replace end-of-life RACs because new models cost too much. Low-income families already have less access to air conditioning than their more affluent counterparts. DOE's proposal will likely make this problem worse.

Turning RACs into a luxury-cost good rather than an affordable product could have dire effects. Extreme heat kills more people in the United States than any other hazardous weather event. [12] And heatwaves are expected to become more common, more severe, and longer-lasting.[13] Communities of color are disproportionately affected by extreme temperatures because of the legacies of discriminatory-effect decision-making that have resulted in more paved surfaces and less trees in poorer neighborhoods, both of which result in hotter temperatures.[14] A study conducted last year by the American Geophysical Union found that "within counties across the United States—even with their very different geographies and histories—neighborhoods with

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8 *See* Residential Energy Consumption Survey – Air Conditioning, Table HC7.5, United States Energy Information, rel. 2015, https://www.eia.gov/consumption/residential/data/2015/hc/php/hc7.5.php.

9 *See* Tables V.26, V.27, V.28, V.29, 87 Fed. Reg. at 20657–58.

10 *See* Residential Energy Consumption Survey – Air Conditioning, Table HC7.5.

11 87 Fed. Reg. at 20657–62.

12 Nina Lakhani, *Study Finds Link Between Deadly Heatwave Exposure and Redlining Housing Policies*, Yale Environment 360 (Jan. 16, 2020), https://e360.yale.edu/digest/study-finds-link-between-deadly-heatwave-exposure-and-redlining-housing-policies.

13 *Id.*

14 Tony Barboza & Ruben Vives, *Poor Neighborhoods Ber the Brunt of Extreme Heat, 'Legacies of Racist Decision-making,'* LA Times (Oct. 28, 2021), https://www.latimes.com/california/story/2021-10-28/extreme-heat-built-environment-equity; *see also* Meg Anderson, *As Rising Heat Bakes U.S. Cities, The Poor Often Feel It Most*, NPR (Sept. 3, 2019), https://www.npr.org/2019/09/03/754044732/as-rising-heat-bakes-u-s-cities-the-poor-often-feel-it-most.

lower-income and higher shares of non-white residents experience significantly more extreme surface urban heat than their wealthier, whiter counterparts."[15]

Not surprisingly, access to air conditioning has proven to be the key to preventing heat-related illness or death. This is particularly critical for older Americans in urban areas. Studies have consistently documented that lack of access to air conditioning is linked to the disproportionate risk of heat-related illness and death among seniors who live in cities in the United States.[16] A seminal study of the heat-related deaths during the Chicago heat wave of 1995 found that "[h]aving a working air conditioner was associated with an 80% reduction in the risk of death due to heat and cardiovascular disease and a 66% reduction in mortality due to cardiovascular disease."[17] The study also found that "the strongest protective factor [against heat-related illness and death] was having a working air conditioner in the home."[18]

The proposal's impact on poor and historically marginalized families would undermine the Administration's commitment to ensuring federal policies do not perpetuate systemic inequities. At the beginning of his term, President Biden directed federal agencies to assess "whether underserved communities and their members face systemic barriers in accessing benefits and opportunities available pursuant to those policies and programs."[19] The Administration has also pledged to address environmental injustices such as these as an integral part of its mission in combatting climate change.[20] DOE has, so far, taken these calls to action seriously. It has recognized that "[t]he clean energy revolution must lift up these communities that have been left behind, and make sure those who have suffered the most are the first to benefit."[21] DOE's proposed RAC standards, however, would fly in the face of these policy goals. If RACs are too expensive, extreme heat will continue to disproportionately affect low-income and historically marginalized families. Friedrich urges DOE to avoid this grim result.

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15 Susanne Amelie Benz & Jennifer Anne Berney, *Widespread Race and Class Disparities in Surface Urban Heat Extremes Across the United States*, AGU (July 13, 2021), https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2021EF002016; *see also* Deepa Shivaram, *Extreme Heat Is Worse For Low-Income, Nonwhite Americans, A New Study Shows*, NPR (July 14, 2021), https://www npr.org/2021/07/14/1015983700/extreme-heat-is-getting-worse-for-low-income-non-white-americans-a-new-study-sho.

16 Rachel Morello Frosch, et al., *The Climate Gap: Inequalities in How Climate Change Hurts Americans & How to Close the Gap* (2018), available at https://dornsife.usc.edu/assets/sites/242/docs/The_Climate_Gap_Full_Report_FINAL.pdf

17 Jan C. Semanza, et al., *Heat-Related Deaths During the July 1995 Heat Wave in Chicago*, 335 N. Engl. J. Med. 84, 87 (1996), available at https://www nejm.org/doi/pdf/10.1056/NEJM199607113350203?articleTools=true.

18 *Id.*

19 Exec. Order No. 13,985, 86 Fed. Reg. 7009, 7010, available at https://www.govinfo.gov/content/pkg/FR-2021-01-25/pdf/2021-01753.pdf.

20 *See FACT SHEET: President Biden Takes Executive Actions to Tackle the Climate Crisis at Home and Abroad, Create Jobs, and Restore Scientific Integrity Across Federal Government*, The White House (Jan. 27, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/27/fact-sheet-president-biden-takes-executive-actions-to-tackle-the-climate-crisis-at-home-and-abroad-create-jobs-and-restore-scientific-integrity-across-federal-government/.

21 *Promoting Energy Justice*, Dep't of Energy, https://www.energy.gov/promoting-energy-justice (last visited Jun. 3, 2022).

2. TSL 3 is not feasible or justified because RACs would be too large and too heavy.

DOE's support for TSL 3 relies on this expectation: "At this level, DOE does not expect industry to adopt new or larger chassis designs."[22] But TSL 3 will, in fact, require such changes. Thus, DOE's expectation is unwarranted, and it must conclude that TSL 3 is not technologically feasible.

Based on the extensive experience Friedrich and its competitors have had with RACs, TSL 3 would require RAC chassis to be enlarged and become heavier. This is due, in substantial part, to increased heat exchanger cross-sectional area and compressor size. As DOE explains:

> increasing the heat exchanger cross-sectional area would directly impact the room AC size and weight, which are important factors that impact consumer utility of all room ACs, especially smaller-capacity models. Because room ACs must fit within a limited space, either a window or wall opening, manufacturers are limited in their ability to increase the overall size of room ACs currently on the market. Further, because smaller-capacity room ACs are typically only installed during the cooling season and may be removed during the heating season to avoid cold air leakage into the conditioned space, room AC weight is a key consumer utility factor and would be significantly impacted by an increase in chassis size and weight.[23]

In short, DOE acknowledges that "increasing the heat exchanger frontal surface area will increase unit weight and typically also the chassis size, thereby increasing the unit manufacturing and shipping cost and reducing consumer portability."[24] But TSL 3 would yield precisely this result. DOE tries to avoid this obvious conclusion by suggesting workarounds. But none of these is feasible. For example, as DOE concedes, introducing a 90-degree bend in the heat exchanger to cover more than one surface of the RAC "still results in an increased unit weight and reduction in portability."[25] And increasing heat exchanger depth by adding tube rows and fin density "both require increasing blower capacity to offset the greater pressure drop for the airstream passing over the heat exchanger, and could also increase compressor power consumption to overcome the pressure drop of additional tube rows."[26] Additionally, a greater fin density "could result in more water retention in the evaporator, or accumulation of dust and dirt leading to decreased heat transfer over time."[27]

But the consequences of increased size and weight are even worse than DOE concedes. They show that TSL 3 is neither technologically feasible nor economically justified. First, the increased size would wholly upend DOE's cost analysis. In most cases, a RAC's aspect ratio is sized, with the opening built snugly around the unit. This minimizes heat infiltration and ensures a tight seal

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[22] 87 Fed. Reg. at 20664.

[23] U.S. Dep't of Energy, Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Room Air Conditioners (Mar. 2022) (hereinafter TSD), at 5-17, https://www.regulations.gov/document/EERE-2014-BT-STD-0059-0030.

[24] *Id.* at 3-24.

[25] *Id.*

[26] *Id.*

[27] *Id.* at 3-25.

around the unit. Figure 1, below, shows typically installed units in a New York City public school with the opening sized to the dimensions on the unit. Increasing the size of the chassis to meet the new efficiency requirements will require modifying the structure to accommodate these changes in the dimensions—and impose substantial costs that DOE's economic analysis has failed to consider. Moreover, in many cases, such modifications may be simply impossible.

Figure 1:

Typically, the higher the capacity, the lower the minimum efficiency within the same chassis (unit) size. This is because within a chassis size the size of the heat exchangers, fans, and blowers cannot be changed. Most manufacturers have multiple chassis sizes, and the capacities are split within each chassis size to meet the minimum efficiency requirements. Thus, Equipment Class 5a (20,000 to 27,900 Btu/hr) and 5b (28,000 Btu/hr or more) belong to the largest chassis size offered by the manufacturer. In most cases, if the minimum efficiency levels increase and the manufacturer is unable to meet the minimum efficiency requirements in the current chassis size, then the model is moved to the next bigger chassis size. This is prohibitive from a cost and installation standpoint (the building may not have the capability to install a larger sized unit). Beyond that, even if a consumer could still buy a unit with a larger chassis size to meet his or her cooling load requirement, this is possible only in the case of models that do not belong to the largest chassis size.

Friedrich has particular expertise with large RACs and, in fact, is the only manufacturer that makes an RAC certified greater than 28,300 Btu/hr. Critically, in the case of Classes 5a and 5b, there is not a larger chassis size to accommodate these models and meet the minimum efficiency requirements. The larger units are mostly sold in schools—there are an estimated 60,000 large capacity RACs installed in New York City public schools alone—and thus increasing the minimum efficiency levels to TSL 3 for Class 5a and 5b would essentially ensure that these consumers do not have a product available for their needs.[28] Friedrich estimates the size of units

[28] Schools without central air conditioning in the Northeast are shutting down for "heat days" at an increasing rate, making workable RAC solution even more essential. *See* Laura Meckler & Anna Philips, *Climate Change is Forcing Schools to Close Early for 'Heat Days,"* Washington Post (Jun. 4, 2022), https://www.washingtonpost.com/education/2022/06/04/school-heat-days-climate-change/.

currently in TSL 3 to increase 2″ in height. The estimated weight increase for units currently in TSL 3 is 22 lbs.[29]

Beyond the problems of cost, the inability to fit new RACs in older buildings, and the unavailability of sufficiently powerful units for schools, bigger heavier units are just plain dangerous. To be fair, the Department acknowledges the hazards resulting from increased weight. It notes that the National Institute of Occupational Safety and the Health and Occupational Safety and Health Administration stress risk of injury from handling of loads exceeding 51 pounds. DOE admits that "[t]hese guidelines suggest that products weighing greater than 51 pounds would require multiple people for transportation and installation, thereby highlighting a potential consumer utility concern with increasing the weight of a product to above 51 pounds."[30] DOE even concedes that if it adopts TSL 3, "[t]he resulting evaporator and condenser cross-sectional area increases [will] range[] . . . [up] to about 150 percent,"[31] and increasing size 150% is (obviously) also going to increase weight.

Despite this, the Department took weight into consideration when proposing standards only for the smallest capacity models (Product Class 1).[32] The Department's justification for forcing the creation of bigger, heavier units—even though installing them is dangerous—is that two people will install them rather than one. This ignores the real-world experience we all share: it is burdensome to have a piece of equipment that is so bulky that it requires two people, rather than one, to install it. The Department's approach also ignores that RACs have historically been designed to be a product that can safely, conveniently, and inexpensively be transported and installed by one person. DOE's approach almost mocks those who live alone or live with another person who is unable to help shoulder the unwarranted installation burden.

The bottom line is that TSL 3 is not technologically feasible or economically justified under the EPCA because it will force RACs to be too large and too heavy with adverse financial and other consequences for individuals and institutions.

3. DOE's standards rely on an overstated calculation of operating hours that does not reflect actual consumer behavior.

A critical element in establishing a standard for RACs is their energy consumption, which, in turn, is heavily reliant on the number of hours consumers operate the units. This energy usage analysis provides the basis for other analyses, particularly assessments of the energy savings and the monetary savings in consumer operating costs that could result from adoption of new standards. Simply put, the more operating hours, the more money saved under a new DOE standard. Conversely, the fewer operating hours, the less money saved. In this case, DOE did not base its calculation of consumer use on actual consumer use (metering of individual appliances)—which

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[29] Equipment currently in TSL 4 is estimated to increase in size by 2.5″ in height and 2″ in width. The estimated weight increase for equipment currently in TSL 4 is 59 lbs.

[30] TSD at 5-19.

[31] *Id.*

[32] *Id.* at 5-18 & 5-19.

it could have done.[33] Rather it used a model involving heat load modeling, with no direct field verification of consumer usage. As discussed in AHAM's comments, the model contains significant errors in sampling, data accuracy, and modeling accuracy. In addition, DOE's approach ignores that RACs are often not thermostatically driven, load following, but rather are turned on and off by users to suit their needs. Further, RACs operate heavily at peak capacity, with relatively few hours maintaining temperature at part load. Thus, RACs tend to be turned on when it is very hot or when a room is occupied. Moreover, as noted, a large percentage of RACs are used by lower income households, which have an incentive to limit actual operating hours in order to save money. In addition, RACs are most heavily located in low cooling areas, the Northeast and Middle Atlantic,[34] which also tends to reduce hours of usage.

In short, DOE's heat load modeling calculations overstate consumer usage. The best analog to RAC usage is portable air conditioner (PAC) usage—for which an actual study has been done.[35] Extrapolating the results from that study to a four-month cooling season in the northeast (June through September) would yield approximately 140 cooling operating hours per year. The measured data for PACs adjusted for seasonality is on the order of 210 hours. Yet, using its model, DOE estimates 900-1,000 annual cooling hours for RACs under 8,000 Btu/hr and about 600 hours for five other product classes. Product classes 1-4 (louvered RACs without reverse cycle under 20,000 Btu/hr) represent over 90% of RAC shipments reported to AHAM. DOE's calculation is vastly overstated.

As one would expect, DOE's errors in calculating hours of use have a major effect on whether the proposed standard is economically justified. Using all of the other assumptions in DOE's LCC analysis, the change in mean LCC drops down to $8 from $39 for product classes 1-4 at 210 hours and drops down to $3 from $23 at 140 hours.

4. DOE failed to account for the supply chain impact or the costs to service RACs with variable-speed compressors and increased heat exchanger sizes.

TSL 3 would *require* variable-speed compressors (VSCs) and larger heat exchanger sizes for units at or above 8,000 Btu/hr.[36] Friedrich thinks VSCs have many valuable uses. But, as DOE notes, they "are typically operated with electronic controls that vary the compressor motor power frequency"[37] and thus are more complex than a single-speed compressor. DOE's failure to account for the additional cost of repairing these more complex pieces of equipment and thus its economic justification for a TSL 3 standard is wrong for this reason as well. Any increase in the number of electronic components will increase the likelihood of a component failure. A variable-speed drive (VSD) is inherently more expensive than a single-speed relay board (usually by a magnitude of

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33 *Id.* at 7-10.

34 *See* Residential Energy Consumption Survey – Air Conditioning, Tables HC7.7 & HC7.8.

35 Thomas Burke, et al., *Using Field Metered Data to Quantify Annual Energy Use of Portable Air Conditioners,* Lawrence Berkeley National Laboratory (Dec. 2014), available at https://eta-publications.lbl.gov/sites/default/files/lbnl-6868e.pdf.

36 TSD at 12-41; 87 Fed. Reg. at 20664.

37 TSD at 3-33.

300%) due to complexity. As a result, both the likelihood and cost of a replacement will increase, leading to a negative financial impact to the consumer which DOE simply ignored.

Additionally, by requiring an increase in the size of a heat exchanger, DOE also ensures more braze joints will be added to an individual system. The increase in braze joints increases the potential of leaks which will also cause negative financial impact to the consumer. In the event of a refrigerant leak on a RAC, the service charge is typically more expensive than the initial equipment cost. Most informed consumers will replace the equipment rather than repair the unit which, of course, would also affect payback if the replacement happens before the payback period has been reached.

In addition, Friedrich has lead times greater than 170 days on electrical components due to a global shortage of these components. And it has not seen evidence that the global shortage will ease at any point in the next few years (many of Friedrich's electrical components are being purchased over a year in advance). An industry-wide move to VSDs due to the necessity of VSCs to meet minimum efficiencies, will further burden the supply chain. This will exacerbate component shortages, which will adversely affect Friedrich's ability to provide RACs to meet the consumer demand. This will, in turn, decrease the supply of available RACs and result in higher up-front cost than DOE is estimating. As many of the electronic components are used in other industries as well, this stress could cause higher prices in other consumer goods that DOE does not account for in the economic analysis. A shortage of electrical components will also lead to delays in the servicing of equipment, which would result in consumers either going without air conditioning or having to replace the equipment earlier than expected.

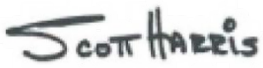
Finally, copper and aluminum prices have increased 160% in the last 5 years. An industry-wide move to larger heat exchanger sizes will further stress the supply of those metals and not only affect the upfront cost of a RAC, but all other industries that use copper and aluminum. The resulting impact to the pricing of the consumer goods industry as a whole should also have been considered as part of DOE's economic analysis.

5. <u>Most of DOE's options for increasing RAC efficiency do not offer any benefit.</u>

Table IV.1 of DOE's NOPR lists technological options for increasing RAC efficiency. However, most of these technologies do not offer any benefit (*e.g.*, suction line heat exchanger) for the refrigerant used or have already been used (condenser coil subcooler, DC fan and blower motors, etc.) to maximize efficiency. Further technologies like microchannel heat exchangers have issues with galvanic corrosion (due to condensate splashing) and thus may not be appropriate for R32 application where minimizing leakage is paramount. Simply put, DOE's suggestions for increasing RAC efficiency, while well-intentioned, are not realistic.

CONCLUSION

For a multitude of reasons, DOE's proposed TSL 3 is neither technologically feasible nor economically justified. Adopting this standard therefore would violate the EPCA. Friedrich urges DOE to instead adopt the standards proposed by AHAM in its comments.



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June 6, 2022