

United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Argued September 9, 2021

Decided January 18, 2022

No. 20-1068

AMERICAN PUBLIC GAS ASSOCIATION,
PETITIONER

v.

UNITED STATES DEPARTMENT OF ENERGY,
RESPONDENT

AMERICAN GAS ASSOCIATION, ET AL.,
INTERVENORS

Consolidated with 20-1072, 20-1100

On Petitions for Review of a Final Rule
of the U.S. Department of Energy

Barton Day argued the cause for petitioners Spire, Inc. and Spire Missouri, Inc. *Stephanie Weiner* argued the cause for petitioner Air-Conditioning, Heating, and Refrigeration Institute. With them on the joint briefs were *John P. Gregg*, *William C. Simmerson*, *Scott Blake Harris*, *Jason Neal*, and *Daniel P. Tingley*. *Matthew J. Agen* and *Michael L. Murray* entered appearances.

Jack Starcher, Attorney, U.S. Department of Justice, argued the cause for respondent. With him on the briefs were *Brian M. Boynton*, Acting Assistant Attorney General, and *Michael S. Raab*, Attorney.

Michelle Wu argued the cause for respondent - intervenors. With her on the brief were *Aaron Colangelo*, *Ian Fein*, *Letitia James*, Attorney General, Office of the Attorney General for the State of New York, *Patrick Woods*, Assistant Solicitor General, *Lisa S. Kwong*, Assistant Attorney General, *Matthew Rodriquez*, Acting Attorney General, Office of the Attorney General for the State of California, *David Zonana*, Acting Senior Assistant Attorney General, *Kwame Raoul*, Attorney General, Office of the Attorney General for the State of Illinois, *Daniel I. Rottenberg*, Assistant Attorney General, *Aaron M. Frey*, Attorney General, Office of the Attorney General for the State of Maine, *Katherine E. Tierney*, Assistant Attorney General, *Timothy D. Ballo*, *Brian Frosh*, Attorney General, Office of the Attorney General for the State of Maryland, *John B. Howard, Jr.*, Special Assistant Attorney General, *Maura Healey*, Attorney General, Office of the Attorney General for the Commonwealth of Massachusetts, *Christophe Courchesne*, Deputy Chief, *Keith Ellison*, Attorney General, Office of the Attorney General for the State of Minnesota, *Peter Surdo*, Special Assistant Attorney General, *Aaron D. Ford*, Attorney General, Office of the Attorney General for the State of Nevada, *Heidi Parry Stern*, Solicitor General, *Gurbir S. Grewal*, Attorney General, Office of the Attorney General for the State of New Jersey, *Paul Youchak*, Deputy Attorney General, *Ellen F. Rosenblum*, Attorney General, Office of the Attorney General for the State of Oregon, *Steve Novick*, Special Assistant Attorney General, *Thomas J. Donovan, Jr.*, Attorney General, Office of the Attorney General for the State of Vermont, *Nicholas Persampieri*, Assistant Attorney General,

Karl A. Racine, Attorney General, Office of the Attorney General for the District of Columbia, and *Loren L. AliKhan*, Solicitor General. *Gerald Karr*, Assistant Attorney General, Office of the Attorney General for the State of Illinois, entered an appearance.

Before: SRINIVASAN, *Chief Judge*, JACKSON, *Circuit Judge*, and GINSBURG, *Senior Circuit Judge*.

Opinion for the Court filed by *Senior Circuit Judge GINSBURG*.

GINSBURG, *Senior Circuit Judge*: The Energy Policy and Conservation Act authorizes the Secretary of Energy to set energy efficiency standards for certain commercial and industrial equipment. The Secretary may not, however, establish a standard more stringent than that promulgated by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) unless she has clear and convincing evidence the more stringent standard is economically justified, technically feasible, and will lead to significant conservation of energy.

In January 2020, the Department of Energy published a Final Rule that set more stringent efficiency standards than those of the ASHRAE for “commercial packaged boilers,” large boilers commonly used to heat commercial and multifamily residential buildings. Energy Conservation Program: Energy Conservation Standards for Commercial Packaged Boilers, 85 Fed. Reg. 1592. In these consolidated cases, the American Public Gas Association, the Air-Conditioning, Heating, and Refrigeration Institute, Spire Inc., and Spire Missouri Inc. petition for review of the Final Rule, alleging numerous deficiencies with the rule. Because we are not persuaded it was reasonable for the Secretary to conclude

the Final Rule was supported by clear and convincing evidence, we remand the rule to the DOE to address several points raised by the petitioners within a limited time.

I. Background

The Energy Policy and Conservation Act, as amended in 1992, prescribes energy efficiency standards for certain commercial and industrial equipment. *See* 42 U.S.C. § 6313. It also authorizes the Secretary of Energy to amend a standard if certain conditions are met. *See id.* § 6313(a)(6). The Congress tethered the Secretary's amendment of a standard for equipment covered by Section 6313 to the internationally recognized standards promulgated by the ASHRAE, known as ASHRAE/IES Standard 90.1. *Id.* Specifically, if the ASHRAE amends Standard 90.1 for equipment covered by Section 6313, then the Secretary must at the least amend her standard correspondingly. *Id.* § 6313(a)(6)(A)(ii)(I). The Secretary may, however, instead adopt a more stringent standard if she determines by clear and convincing evidence that doing so (a) "would result in significant additional conservation of energy," (b) is "technologically feasible" for the industry, and (c) is "economically justified," *id.* § 6313(a)(6)(A)(ii)(II), in which case she must issue a rule establishing the more stringent standard within 30 months of ASHRAE's publication of its amendment to Standard 90.1, *id.* § 6313(a)(6)(B)(i).

In determining whether a more stringent standard is "economically justified," the Secretary is required to consider "to the maximum extent practicable" (1) "the economic impact of the standard on the manufacturers and on the consumers of the products subject to the standard"; (2) "the savings in operating costs throughout the estimated average life of the product in the type (or class) compared to any increase in the price of, or in the initial charges for, or maintenance expenses

of, the products that are likely to result from the imposition of the standard” or, in other words, the difference in the life-cycle cost (LCC) of equipment with and without a more stringent standard; (3) “the total projected quantity of energy savings likely to result directly from the imposition of the standard”; and other factors not relevant here. *Id.* § 6313(a)(6)(B)(ii).

As originally enacted, the statute authorized the Secretary to amend an energy efficiency standard for equipment covered by Section 6313 only in response to a corresponding amendment of Standard 90.1 by the ASHRAE. In 2007, however, the Congress added a “lookback” provision, providing that if the ASHRAE has not amended Standard 90.1 for six years for a category of covered equipment, then the Secretary must evaluate whether a more stringent standard is necessary for that category of equipment. Energy Independence and Security Act of 2007, Pub. L. 110-140, § 305(b), 121 Stat. 1554 (codified at 42 U.S.C. § 6313(a)(6)(C)(i)). As all parties agree, however, even under the “lookback” provision, the Secretary may establish a more stringent standard only if she determines by clear and convincing evidence that the standard will result in significant conservation of energy, is technologically feasible, and is economically justified. *See id.* § 6313(a)(6)(C)(i)(II) (seemingly incorporating by reference the clear and convincing standard of § 6313(a)(6)(A)); *see also* Energy Conservation Program for Appliance Standards: Procedures for Use in New or Revised Energy Conservation Standards and Test Procedures for Consumer Products and Commercial/Industrial Equipment, 85 Fed. Reg. 8626, 8643 (2020) (noting that the plain language of the statute indicates the clear and convincing standard applies to the “lookback” provision).

Commercial packaged boilers are covered by Section 6313. 42 U.S.C. § 6311(1)(J). A commercial packaged boiler

is one that, among other things, has a rated input of at least 300 kBtu/h and is used “for space conditioning and/or service water heating in buildings.” 10 C.F.R. § 431.82(1)-(2). The DOE categorizes packaged boilers based upon their size (small, large, and very large), the type of fuel they use (gas-fired or oil-fired), and their heating medium (hot water or steam). Thus, there are 12 categories of packaged boilers. 85 Fed. Reg. at 1594.

In July 2009, the DOE promulgated a Final Rule for commercial packaged boilers, adopting the ASHRAE’s 2007 amendment to Standard 90.1. Energy Conservation Program for Certain Industrial Equipment: Energy Conservation Standards and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment, 74 Fed. Reg. 36312. Since then, Standard 90.1 has been updated several times but never with respect to the efficiency standards for commercial packaged boilers.

In 2016, the DOE, pursuant to the “lookback” provision, proposed new, more stringent energy efficiency standards for eight of the twelve categories of commercial packaged boilers. Energy Conservation Program: Energy Conservation Standards for Commercial Packaged Boilers (Proposed Rule), 81 Fed. Reg. 15836. Based upon data it had gathered and analyzed, the DOE “tentatively concluded that there is,” as required, “clear and convincing evidence to support more stringent standards” for most types of commercial packaged boilers. *Id.* at 15838.

In order to satisfy its statutory mandate to consider “the economic impact of the [proposed] standard ... on the consumers of the products subject to the standard” and the difference in LCC savings the standard would bring about, 42 U.S.C. § 6313(a)(6)(B)(ii)(I)-(II), the DOE set out to compare

the LCC of equipment with and without an amended standard. The LCC of any piece of equipment is the sum of (a) the purchase price (including installation cost and sales tax) and (b) the lifetime cost of operating it (fuel, maintenance, and repair), discounted to present value.

Conceptual simplicity belies operational complexity. The DOE had to construct a no-new-standards, or base, case and a new-standards case and compare the two. Construction of each case required the DOE to compile a representative sample of commercial and residential buildings, for which it used the Energy Information Administration's 2012 Commercial Buildings Energy Consumption Survey (CBECS) and 2009 Residential Energy Consumption Survey (RECS).

Next, for both the base case and the new-standards case, the DOE had to assign boilers with specific efficiency levels to buildings. Assigning boilers in the base case is particularly tricky, as it involves predicting how the world would look without new standards. Historical shipping data provides the most accurate picture of the mix of boilers in a world without new standards, but the DOE had historical shipping data for only two of the eight relevant categories of boilers, so it assumed the distribution of efficiency levels in shipped equipment was the same as the distribution of efficiency levels among models listed in the database maintained by the AHRI. After accounting for the mix of efficiency levels in shipped boilers, the DOE assigned boilers to buildings randomly: An efficiency level associated with 30 per cent of the models listed in the AHRI data base had a 30 per cent chance of being selected for any given boiler/building combination.

For both the base case and the new-standards case, the DOE also had to calculate the burner operating hours and the energy use of a given boiler in any boiler/building combination.

To this end, the DOE had to make assumptions about the heat load (the amount of heat energy per unit of time that is needed to maintain a certain temperature in a defined space) of the sample buildings, namely that for every square foot of heated area, a building uses an average of 30 Btu/h, and about the number and size of the boilers in those buildings. 85 Fed. Reg. at 1624.

Finally, in order to estimate the operating cost associated with energy use for any given boiler/building combination, the DOE had to predict the cost of energy over the lifetime of the equipment, which the DOE assumed was 24.8 years. *Id.* at 1594. For this, the DOE turned to the energy prices forecasted in the Energy Information Administration's 2016 Annual Energy Outlook.

During the period for comment on the proposed standards, many parties raised concerns regarding the DOE's data and conclusions. Those relevant to the petitions for review are discussed in Part II below.

In January 2020 the DOE published its Final Rule, which was, as relevant here, substantively equivalent to its Proposed Rule. The DOE did, however, somewhat update its justification for the amended standards. Whereas the preamble to the Proposed Rule simply said the "lookback" provision demands clear and convincing evidence and the proposed standards satisfy that requirement, *see* 81 Fed. Reg. at 15837, the preamble to the Final Rule initially responded to comments questioning whether the heightened standard was satisfied by disputing their premise, claiming the "lookback" provision does not demand clear and convincing evidence. 85 Fed. Reg. at 1607. The preamble went on, however, to say "assuming that clear and convincing evidence is required here, DOE believes its findings fully satisfy that threshold." *Id.* 1607-08.

The American Public Gas Association (APGA), the members of which are publicly owned gas distribution systems, petitioned for review of the Final Rule. That petition was consolidated with the petitions of the Air-Conditioning, Heating & Refrigeration Institute (AHRI), a trade association representing manufacturers of covered equipment, and of Spire Inc., an owner and operator of natural gas utilities, and its subsidiary Spire Missouri Inc., a natural gas utility. The American Gas Association, representing more than 200 local energy companies, intervened in support of the petitioners.

The DOE agrees with the petitioners that the Final Rule is invalid but solely on the ground that the DOE failed to apply the clear and convincing standard required by statute; it urges the court not to reach the merits of the petitioners' more specific challenges to the analysis supporting the rule, which it unhelpfully failed to address in its brief. Because the DOE refused to defend the legality of the Rule, 11 states, two municipalities, and four non-profit organizations intervened to do so. Furthermore, in contrast to the petitioners, who have consistently asked us to vacate the Final Rule, the DOE has revised its initial position and now seeks a remand without vacatur.

II. Analysis

We have jurisdiction over these petitions for review pursuant to 42 U.S.C. §§ 6306(b)(1), 6316(a)(1). Under the Administrative Procedure Act, we must “hold unlawful and set aside agency action, findings, and conclusions found to be arbitrary, capricious ... or otherwise not in accordance with law.” 5 U.S.C. § 706(2)(A). Agency action is arbitrary and capricious if a reviewing court cannot discern from the record that the agency action was the product of reasoned decision

making. *Van Hollen, Jr. v. Fed. Election Comm'n*, 811 F.3d 486, 495 (D.C. Cir. 2016). An agency has not engaged in reasoned decision making if it “entirely failed to consider an important aspect of the problem,” *Motor Vehicle Mfrs. Ass’n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983), or if it did not “engag[e] the arguments raised before it,” *NorAm Gas Transmission Co. v. F.E.R.C.*, 148 F.3d 1158, 1165 (D.C. Cir. 1998).

A. Clear and Convincing Evidence Standard

There is a further wrinkle to rulemaking under the “lookback” provision. All parties now agree the Secretary is not authorized to establish a more stringent efficiency standard for commercial packaged boilers under the “lookback” provision unless there is clear and convincing evidence that the standard would result in significant additional conservation of energy, would be technologically feasible, and is economically justified. See § 6313(a)(6)(C)(i)(I)-(II) (incorporating the criteria set forth in § 6313(a)(6)(A)-(B) for the Secretary’s review occasioned by an amendment by the ASHRAE to Standard 90.1).

The requirement of “clear and convincing evidence” as a prerequisite to informal rulemaking is unusual, perhaps unique; we are aware of no other authorization for rulemaking subject to this heightened evidentiary standard. The standard is familiar, however, from other areas of the law: clear and convincing evidence requires a factfinder (in this case the Secretary) to have an “abiding conviction” that her findings (in this case that a more stringent standard would result in significant additional conservation of energy, would be technologically feasible, and is economically justified) are “highly probable” to be true. *Colorado v. New Mexico*, 467 U.S. 310, 316 (1984).

This unusual framework creates an unusually strong bias in favor of the status quo: The DOE may not establish a more stringent standard unless it clears the heightened evidentiary hurdle established by the Congress. The statute, it is true, requires the Secretary to consider a list of factors only “to the maximum extent practicable” when determining whether a more stringent standard is “economically justified,” 42 U.S.C. § 6313(a)(6)(B)(i), but the phrase “to the maximum extent practicable” does not modify the clear and convincing evidence requirement; it modifies only the requirement to consider specific factors. What it means, therefore, is that if it is impracticable for the DOE to consider further one or more of the enumerated factors, but there is clear and convincing evidence based upon the other factors, then the Secretary may promulgate a more stringent standard.

The Respondent-Intervenors argue instead that “the agency is required to ... conclude whether the standards are economically justified by clear and convincing evidence but only to the maximum extent practicable.” Oral Argument at 1:09:01. This conflates the nonnegotiable evidentiary standard with the specific factors DOE must consider in determining whether that standard has been met. Difficulty in satisfying the clear and convincing standard is not a justification for ignoring it.

Even where clear and convincing evidence is required before an agency can act, however, judicial review of agency action remains deferential. The court asks itself only whether it was reasonable for the agency to determine it met the standard. *Sea Island Broad. Corp. of S.C. v. F.C.C.*, 627 F.2d, 240, 244 (D.C. Cir. 1980); *Mo. Pub. Serv. Comm’n v. Fed. Energy Regul. Comm’n*, 864 F.3d 589, 590 n.1 (Millett, J., concurring).

B. Challenges to the Final Rule

The petitioners' most meritorious challenges to the Final Rule target the assumptions and data the DOE used to conclude that more stringent efficiency standards were economically justified by clear and convincing evidence. Before turning to those challenges, however, we pause briefly to dispose of two other intertwined challenges: (1) that the DOE — in contravention of its statutory mandate — did not in fact apply the clear and convincing evidentiary standard; and (2) that the DOE did not provide proper notice and explanation, as required by the Administrative Procedure Act, *see Env'tl. Integrity Project v. E.P.A.*, 425 F.3d 992, 998 (D.C. Cir. 2005) (notice) and *Physicians for Soc. Responsibility v. Wheeler*, 956 F.3d 634, 644 (D.C. Cir. 2020) (explanation), when it departed from agency precedent by holding the “lookback” provision does not demand clear and convincing evidence.

1. Whether the DOE applied the clear and convincing standard

The petitioners and the DOE itself argue the rulemaking is fatally flawed because the DOE did not apply the clear and convincing evidence standard required by statute. They point to the DOE's initial response to questions about its claim to have clear and convincing evidence, when it said the “lookback” provision is not subject to the clear and convincing standard. Any mentions in the preamble to the Final Rule of the clear and convincing standard should be disregarded, the petitioners' argument goes, as not embodying the agency's “express and considered conclusion.”

We reject this argument summarily. In promulgating the Final Rule, the DOE expressly said satisfaction of the clear and

convincing standard, if applicable, was an alternative ground supporting the Rule. *See* 85 Fed. Reg. at 1607-08 (“assuming that clear and convincing evidence is required here, DOE believes its findings fully satisfy that threshold”). The DOE then continued with a lengthy analysis of what the clear and convincing standard requires. *Id.* at 1608; *see also id.* at 1606, 1674 (stating the clear and convincing standard had been met). Thus, the preamble to the Final Rule provides ample evidence that this alternative ground embodied the agency’s “express and considered conclusion.” In any event, judicial review does not authorize the court to rewrite the decision being challenged, nor to disregard what the agency clearly said.

Relatedly, the petitioners argue the Final Rule is unlawful because (a) the DOE departed without acknowledging or distinguishing its precedent and practice of interpreting the statute as requiring clear and convincing evidence for rulemaking under the “lookback” provision; and (b) the DOE failed to provide notice of its plan to abandon this long-held position. Because we have just rejected the premise of this argument, nothing more need be said about it.

2. Challenges to the DOE’s Conclusion that More Stringent Standards are Economically Justified

The remaining challenges to the Final Rule focus upon various aspects of the DOE’s determination that more stringent efficiency standards are economically justified.

a. Random assignment of boilers to buildings

As described above, in conducting the LCC analysis, the DOE had to and did describe the world as it would be if the agency issued no new standards and then compared that world to a world with new standards. In constructing the no-new-

standards case, the DOE assumed the distribution of efficiencies among shipped boilers is the same as the distribution of efficiencies across the models listed in the AHRI data base. As a result, when the DOE ran trials randomly assigning boilers to buildings in the no-new-standards case, the chance a boiler with a certain efficiency level would be assigned to a building in the sample was equal to the percentage of boilers in the AHRI database with that efficiency level, without regard to the characteristics of the building to which the boiler was assigned.

Therefore, although the assignment of boilers to a building was not completely random, as it accounted for the relative prevalence of efficiency levels among boilers, it did not account for the type of building to which boilers were assigned. This means, the petitioners point out, the DOE failed to recognize that a purchaser of commercial packaged boilers would rationally consider the costs and benefits of its investment and is likely to buy the boiler that produces the best economic performance for its building. Indeed, it is difficult to believe purchasers of commercial packaged boilers, which are often large, sophisticated businesses, do not account for life-cycle costs when making a purchase. Random assignment, the petitioners contend, elides this reality. If a purchaser selects the most efficient unit for its building, then the DOE's model will assign the benefits of that choice to its rule, rather than attributing it, correctly, to the purchaser's rational decision making. As a result, the petitioners argue, the DOE inflated the economic value of a more stringent standard by attributing to a new regulation economic benefits that would be realized even without a new regulation.

Responding in the Final Rule to comments raising this concern, the DOE rather dismissively noted that "development of a complete consumer choice model, to support an alternative

to random assignment in the no-new-standards case, for boiler efficiency would require data that are not currently available, as well as recognition of the various factors that impact the purchasing decision.” 85 Fed. Reg. at 1638. In a later section meant to justify the rule under Executive Orders 12866 and 13563, the DOE lists several possible market failures as “problems that this standards [sic] address, *id.* at 1676, but the DOE provided not actual evidence that these market failures affect the market for commercial packaged boilers and thus justify the assumptions that underly its analysis.

The assignment of efficiencies to the buildings in the sample was a crucial part of the analysis supporting the DOE’s conclusion that a more stringent standard was warranted. The significant concerns the petitioners raised about this assignment therefore demand a more complete response. Instead of producing evidence of some market failure in this specific market, the DOE essentially said it did the best it could with the data it had. This is not enough to justify assuming a purchaser’s decisions will not align with its economic interests in purchasing a boiler. Indeed, the DOE’s lackadaisical response would have been inadequate even if the rulemaking were not governed by a heightened evidentiary standard, for the DOE’s failure to “engage the arguments raised before it,” *Del. Dep’t of Natural Res. & Env’tl. Control v. EPA*, 785 F.3d 1, 11, 13-14 (D.C. Cir. 2015), bespeaks a failure to consider an “important aspect of the problem,” *State Farm*, 463 U.S. at 43. At any rate, the DOE’s response certainly is problematic under the heightened standard requiring clear and convincing evidence. Without a cogent and reasoned response to the substantial concerns the petitioners raised about this crucial part of its analysis, we cannot say it was reasonable for the DOE to conclude that clear and convincing evidence supports the adoption of a more stringent standard.

b. Fuel prices

The petitioners also challenge the DOE's LCC analysis insofar as it involves predicting energy prices. Accurate energy prices are indispensable to the LCC analysis because fuel costs are a large part of the life-cycle cost of a boiler.

In order to estimate future energy prices, the DOE began with historical price data from the Energy Information Administration for various geographic areas, which it then multiplied by forecasted fuel price indices derived from the Energy Information Administration's Annual Energy Outlook 2016. For electricity and natural gas prices, the DOE then applied "seasonal marginal price factors" to obtain marginal fuel prices, which it said better represent the cost to the consumer of changes in energy consumption. For oil, however, the DOE used the average prices, because it did not have sufficient data to convert average prices into marginal prices.

According to the petitioners, the average prices the DOE used do not reflect the marginal prices paid by purchasers of commercial packaged boilers. Because operators of commercial packaged boilers are among the largest purchasers of fuel from energy utilities, they receive volume discounts and enter into hedging contracts, and therefore pay significantly less. Consequently, by using predicted average energy prices to compare the LCC of boilers with and without a heightened efficiency standard, the DOE significantly overstated the savings associated with promulgation of a stricter standard.

The DOE responded that the data sets it used "are the best aggregate sources for energy prices currently available" and it "incorporate[d] many adjustment factors to the average price data and the price trend data to account for the price differences

due to variations in locations, seasons, and market sectors and to ensure that the energy prices are properly accounted for in the economic analysis.” 85 Fed. Reg. at 1632.

This response is conclusory, not explanatory. The DOE never explained how its “adjustment factors” address the specific concerns raised by the petitioners, which are not about “locations, seasons, [or] market sectors.” The DOE points us to the Technical Support Document, which lays out the DOE’s methodology for calculating energy prices. That document correctly states: “Because marginal prices reflect a change in a consumer’s bill associated with a change in energy consumed, such prices are appropriate for determining energy cost savings associated with possible changes to efficiency standards.” In keeping with that insight, we are told “[m]onthly electricity and natural gas prices were adjusted using seasonal marginal price factors to determine monthly marginal electricity and natural gas prices.” None of this addresses the lower prices for fuel allegedly paid by those who operate commercial packaged boilers. Perhaps the DOE could provide a cogent response to the concerns raised by the petitioners, but we cannot discern it in the administrative record. Therefore, we cannot say the Secretary reasonably concluded she had clear and convincing evidence a more stringent efficiency standard is economically justified.

c. Burner operating hours

The petitioners also challenge the DOE’s estimates for burner operating hours. Burner operating hours are crucial for the LCC analysis because the operating cost of a boiler depends, in large part, upon the number of hours its burner operates. The DOE did not have direct data about burner operating hours for its no-new-standard case, so it estimated them based upon building data from CBECS and RECS and

assumptions about heat load, including the adoption of a rule of thumb that for every square foot of heated area, a building uses 30 Btu/h.

Once again, the Technical Support Document provides a lengthy description of the method by which the DOE estimated burner operating hours, and once again, questions went unanswered. During the comment period, a consultant for AHRI pointed to several purported anomalies in the DOE's estimates. Specifically, he said "[c]ommercial buildings are generally cooling load dominated so it would be highly unusual to have one thousand system operating hours per year," yet according to DOE's estimates, the median burner operating hours for six of eight categories of burners was more than 1000 hours, the 90th percentile of two of the eight categories was more than 2000 operating hours, and the maximum burner operating hours in all categories was well over 2000 hours. Further, DOE "surprisingly," he said, estimated that the median, 90th percentile, and maximum burner hours for large boilers are lower than the median, 90th percentile, and maximum burner hours for small boilers of the same type. These results, the consultant argued, should have alerted the DOE to the possibility that either its assumption about heat load or the data from CBECS were faulty.

The DOE twice acknowledged these comments in the Final Rule document but did not respond to them. Rather, the DOE reiterated that it "has high confidence that its building load estimation is representative of the building loads in the field," though it gave no reason for that confidence. 85 Fed. Reg. at 1624. Perhaps more telling, it explained that "DOE has not identified a source of comprehensive burner operating hour data for commercial boilers that could be used for such an analysis nor was such identified to DOE by stakeholders." *Id.* at 1637. Using data ill-suited to the task is not excused by

failure — even good faith failure — to locate suitable data, particularly considering that the Congress here required clear and convincing evidence before the Secretary can disturb the regulatory status quo.

By no stretch was this an exemplar of reasoned decision making. A commenter pointed to seeming anomalies in the DOE's data and the agency ignored them. We need not decide whether this omission would, on its own, be sufficient to say the Secretary could not reasonably conclude she had clear and convincing evidence to support a new standard. Because the Final Rule has other deficiencies, however, we expect on remand a reasoned response to these concerns as well.

d. Proxy for shipment data

The last challenge to the Final Rule relates to the DOE's proxy for shipment data. All agree direct shipment data are optimal. In the absence of such data for six of the eight categories of commercial packaged boilers, however, the DOE turned to publicly available model listings as a proxy for shipments. If 30 per cent of model listings had a certain energy efficiency, then the DOE assumed that the same percent of shipments had that efficiency.

During the comment period, manufacturers argued that the distribution of efficiencies in model listings is not an adequate proxy for the distribution of efficiencies in sales. Responding in the preamble to the Final Rule, the DOE defended its proxy in two ways. First it said model listings likely approximate shipments because “[i]n general, manufacturers are likely to offer models with rated inputs and efficiencies where demand is highest.” 85 Fed. Reg. at 1635. Second, the DOE noted that AHRI had provided historical shipment information for two categories of boilers, and the differences between the proxy

data and the shipment information for these two categories turned out to be minimal. *Id.*

Although the rationale of the DOE's first point is not entirely clear, its second point vindicates its position and is powerful enough to carry the day. Even when clear and convincing evidence is required, there is no bar to relying upon a hypothesis that has been empirically validated, here by the comparison between the proxy data and the shipment data AHRI had provided for two of the eight types of boilers. Especially considering the conclusory nature of the petitioners' challenge to the proxy data — they provided no evidence of the degree to which any inaccuracy might affect the DOE's calculations and conclusions — the DOE's response was adequate. The reasonableness of the DOE's reliance upon the proxy data is magnified when one considers that the AHRI has historical shipment data for all relevant categories of packaged boilers but refused to share them with the agency, a point made by the Respondent-Intervenors that the petitioners did not dispute in their Reply Brief. The upshot is that we cannot say the use of the proxy data, on its own, made it unreasonable for the Secretary to conclude a more stringent standard was supported by clear and convincing evidence.

III. The Remedy

What remains is the matter of a proper remedy. Although “vacatur is the normal remedy” when a rule is found unlawful, *Allina Health Servs. v. Sebelius*, 746 F.3d 1102, 1110 (D.C. Cir. 2014), we have long recognized that remand without vacatur is a useful arrow in a court's remedial quiver. *See Checkosky v. S.E.C.*, 23 F.3d 452, 462-65 (D.C. Cir. 1994). In *Allied-Signal, Inc. v. Nuclear Regulatory Commission*, we said “the decision whether to vacate depends on the seriousness of the order's deficiencies (and thus the extent of doubt whether

the agency chose correctly) and the disruptive consequences of an interim change that may itself be changed.” 988 F.2d 146, 150-51 (1993) (internal quotations omitted).

The pragmatic benefits of remand without vacatur, properly deployed, are undeniable. An open-ended remand without vacatur, however, can create a new problem: The agency may have little or no incentive to fix the deficient rule. Both common sense and the empirical literature confirm this. See Kristina Daugirdas, Note, *Evaluating Remand Without Vacatur: A New Judicial Remedy for Defective Agency Rulemakings*, 80 N.Y.U. L. Rev. 278, 301-05 (2005) (cataloguing extreme examples of agency inaction following remand without vacatur). Therefore, it may sometimes be prudent to require an agency to fix a deficient rule by a time certain, at which the rule will automatically be vacated. See *In re Core Commc'ns, Inc.*, 531 F.3d 849, 862 (Griffith, J., concurring) (D.C. Cir. 2008) (urging future panels to consider alternatives to open-ended remand without vacatur); *A.L. Pharma, Inc. v. Shalala*, 62 F.3d 1484, 1492 (D.C. Cir. 1995) (ordering automatic vacatur if agency does not provide adequate justification within 90 days).

We think remanding the Final Rule to the DOE to reevaluate it within a limited time is the proper remedy here. The deficiencies of the rule may fairly be characterized as failures to explain, the type of deficiency most readily remedied on remand. In its supplemental brief, the DOE represents that it “expects on remand that it will be able to provide a full and sound explanation why the Rule’s standards” — which are slated to go into effect in January 2023 — “satisfy the clear and convincing evidence standard.” Under these circumstances, we think it should be afforded a limited opportunity to do so.

Therefore, we shall remand the Final Rule to the DOE for the agency to take appropriate remedial action within 90 days. If the DOE fails to do so, the Final Rule will automatically be vacated unless the agency demonstrates within ten days of the issuance of this decision the need for additional time.

IV. Conclusion

For the foregoing reasons, the Final Rule is remanded to the DOE, as explained above.