Appliance Standards Awareness Project
Natural Resources Defense Council

July 6, 2021

Mr. Bryan Berringer
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-5B
1000 Independence Avenue SW
Washington, DC 20585

RE: Docket Number EERE–2014–BT–STD–0058/RIN 1904–AD99: Notice of Webinar and Availability of Preliminary Technical Support Document for Clothes Dryers

Dear Mr. Berringer:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP) and Natural Resources Defense Council (NRDC) on the notice of webinar and availability of preliminary technical support document (TSD) for clothes dryers. 86 Fed. Reg. 20327 (April 19, 2021). We appreciate the opportunity to provide input to the Department.

DOE's preliminary analysis shows that large cost-effective savings are achievable for clothes dryers. We continue to encourage DOE to make changes to the test procedure to improve representativeness. In considering potential amended standard levels, DOE should evaluate higher efficiency levels than the "max-tech" levels in the preliminary TSD. We also encourage DOE to consider field data in estimating the number of loads per year and to reevaluate the assumption of increased installation costs for heat pump clothes dryers. Below we address these and other issues in the preliminary TSD.

In addition, in accordance with Executive Order 13990,[1] we urge DOE to withdraw as soon as possible the December 2020 rule establishing separate product classes for short-cycle clothes dryers.[2]

We continue to encourage DOE to consider adding a smaller load to the test procedure and to include testing on more than just the "normal" cycle. In our comments on the July 2019 test procedures notice of proposed rulemaking (NOPR), we explained that adding a smaller test load would better represent the efficiency of clothes dryers in the field and provide better information to consumers about the relative energy use of different clothes dryer models.[3] We also explained that if only the "normal" cycle continues to be tested, consumers may unknowingly end up using significantly more energy than a dryer's rating would suggest. We continue to encourage DOE to consider adding a smaller load to the test procedure and to include testing on more than just the "normal" cycle.

DOE should evaluate higher efficiency levels for certain product classes based on models available on the market and prototypes. As shown in Table 1 below, for three product classes there are models available on the market with rated combined energy factor (CEF) values that are higher than the "max-

[1] https://www.energy.gov/sites/prod/files/2021/02/f82/eere_eo13990_memo_1.pdf.
[2] 85 Fed. Reg. 81359 (December 16, 2020).
[3] https://www.regulations.gov/comment/EERE-2014-BT-TP-0034-0034.

tech" levels in the preliminary TSD. For ventless electric standard dryers, the maximum-available CEF is more than twice as high as the max-tech level. We note that while the drum size of the ventless electric standard models with a CEF of 10.14 (4.5 cu. ft.) is smaller than typical drum sizes, there are also models with a drum size of 7.4 cu. ft. with a rated CEF of 5.20.

Table 1. Max-tech CEF values compared to maximum-available CEFs

	Max-tech CEF	Maximum-available CEF[4]
Vented electric standard	4.30	4.50
Ventless electric standard	4.50	10.14
Ventless electric compact (240 V)	5.70	6.80

In addition, in the preliminary TSD, DOE references a 2016 study by Pacific Northwest National Laboratory (PNNL) that created a prototype hybrid heat pump clothes dryer.[5] However, DOE did not consider this prototype in evaluating potential efficiency levels. The two innovations described in the PNNL report discussing the prototype are: (1) incorporating a recuperative heat exchanger to transfer heat directly from the exhaust to the inlet air; and (2) a novel design of the heat pump condenser that increases the heating provided by the heat pump.[6] As DOE notes in the preliminary TSD, the energy savings for the prototype ranged from 16% to 33% relative to heat pump clothes dryers available on the market at the time of the study.[7]

We encourage DOE to evaluate higher efficiency levels than the max-tech levels in the preliminary TSD based on both existing models on the market and the PNNL prototype.

We encourage DOE to consider data from the NEEA Dryer Field Study in estimating the number of loads per year. For the preliminary analysis, DOE assumed 243 clothes dryer cycles per year for electric standard dryers based on data from the 2015 Residential Energy Consumption Survey (RECS).[8] The Northwest Energy Efficiency Alliance (NEEA) Dryer Field Study published in 2014 found the average number of loads per year to be 311.[9] While the RECS data is based on survey responses and is reported in terms of ranges of cycles per week, the NEEA study calculated the number of loads using a combination of electric load metering and detailed participant logs. We are unaware of any reason why the number of clothes dryer loads in the Northwest would not be representative of the U.S. Therefore, we encourage DOE to consider data from the NEEA Dryer Field Study in estimating the number of loads per year.

We encourage DOE to confirm the baseline annual energy use for ventless electric standard dryers. As shown in Table 2 below, for standard-size electric dryers, the baseline CEF values for vented models and ventless models are almost identical—2.20 and 2.23, respectively—and yet the baseline annual energy consumption for ventless models is almost three times smaller than that for vented models.

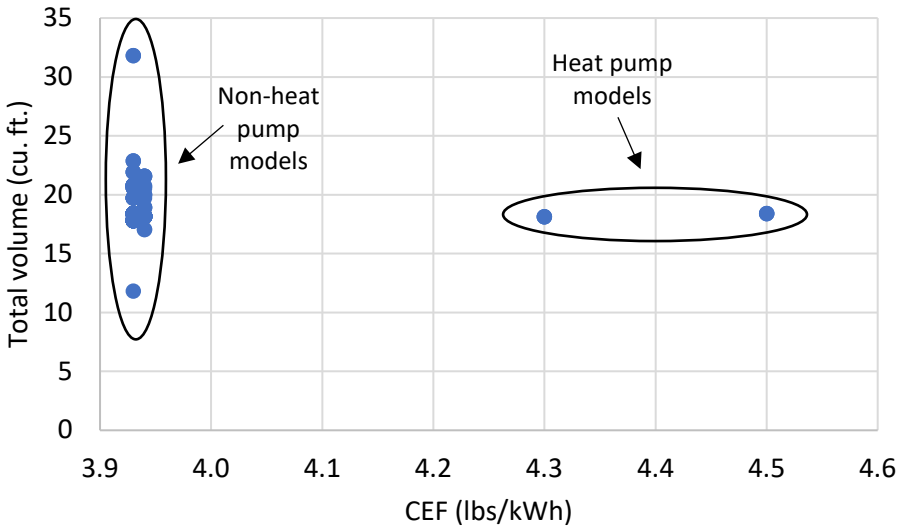
[4] https://www.energystar.gov/productfinder/product/certified-clothes-dryers/results. Accessed May 25, 2021.
[5] https://www.regulations.gov/document/EERE-2014-BT-STD-0058-0016. p. 3-39.
[6] https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-25510.pdf. p. iii.
[7] https://www.regulations.gov/document/EERE-2014-BT-STD-0058-0016. p. 3-39. The PNNL prototype was compared to heat pump dryers with rated CEFs of 4.3 and 4.5.
[8] Ibid. pp. 7-2, 7-3.
[9] https://neea.org/resources/rbsa-laundry-study. p. 13.

Table 2. Baseline CEF and annual energy consumption for vented and ventless standard electric dryers[10]

Product class	Baseline CEF	Baseline annual energy consumption (kWh/year)
Vented standard electric	2.20	975
Ventless standard electric	2.23	359

We encourage DOE to reevaluate the assumption of increased installation costs for heat pump dryers. For the preliminary analysis, DOE assumed that one-half hours of additional labor hours would be required for heat pump clothes dryers due to their larger dimensions relative to conventional dryers.[11] However, it does not appear that heat pump dryers in fact have larger dimensions than conventional dryers. For vented electric standard dryers, the available heat pump models have drum sizes of either 7.3 or 7.4 cu. ft. Figure 1 below shows the total volumes (height times width times depth) of the 187 ENERGY STAR certified models of vented electric standard dryers that have drum sizes of either 7.3 or 7.4 cu. ft. Most of the non-heat pump models have total volumes between 17 and 23 cu. ft., while the heat pump models have total volumes of either 18.1 or 18.4 cu. ft.

Figure 1. Total volumes of the ENERGY STAR certified vented electric standard dryers with drum volumes of 7.3 or 7.4 cu. ft.[12]



Of the 43 Whirlpool ENERGY STAR certified models of vented standard electric dryers with drum sizes of 7.4 cu. ft., 41 are listed with identical heights, widths, and depths of 38 in., 27 in., and 31 in., respectively, including the two heat pump models. The other two models, which have one larger dimension—a height of 42.5 in.—are not heat pumps. Of the 21 LG ENERGY STAR certified models of vented standard electric dryers with drum volumes of 7.3 cu. ft., the two heat pump models have

[10] https://www.regulations.gov/document/EERE-2014-BT-STD-0058-0016. pp. 7-13, 7-14.
[11] Ibid. p. 8-14.
[12] https://www.energystar.gov/productfinder/product/certified-clothes-dryers/results. Accessed May 25, 2021.

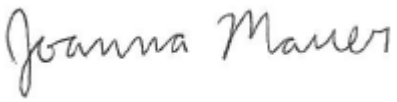
dimensions of 38.69 in., 27 in., and 30 in. for height, width, and depth, respectively, for a total volume of 18.1 cu. ft. All but one of the remaining models have dimensions of 40.19 in., 27 in., and 28.94 in. for a total volume of 18.2 cu. ft.[13]

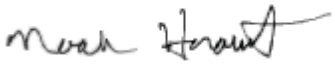
We encourage DOE to investigate how the analysis could reflect learning rates associated with specific technology options. For the preliminary analysis, DOE estimated a learning rate primarily based on historical price data for household laundry equipment.[14] We would expect that, in general, prices of the specific technologies that are employed to improve the efficiency of clothes dryers will decline faster than the total price of clothes dryers. For example, we would expect that prices of heat pump systems will decline faster than the total price of clothes dryers. Therefore, DOE's estimate of the learning rate for clothes dryers, and in particular for heat pump clothes dryers, is likely a conservative estimate of how prices will decline over time. We encourage DOE to investigate how the analysis could reflect learning rates associated with specific technology options for clothes dryers. Such an approach would be similar to that taken in the 2017 final rule for ceiling fans, where DOE estimated a learning rate specific to brushless DC motors.[15]

We encourage DOE to clarify how the change in shipments in the standards case was calculated. The preliminary TSD describes a price elasticity of -0.45 and an efficiency elasticity of +0.2, and we understand that both elasticities impact the standards-case shipments.[16] However, the equation for calculating total shipments in the standards case includes only the price elasticity of -0.45.[17] We encourage DOE to confirm and clarify whether the efficiency elasticity is considered in calculating the standards-case shipments.

Thank you for considering these comments.

Sincerely,





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[13] The other non-heat pump model has dimensions of 45.44 in., 27 in., and 28.94 in.
[14] https://www.regulations.gov/document/EERE-2014-BT-STD-0058-0016. p. 8-7. DOE used historical PPI data for "household laundry equipment" for 1948-2016 and data for "major household appliance: primary products" for 2016-2018.
[15] 82 Fed. Reg. 6854 (January 19, 2017).
[16] https://www.regulations.gov/document/EERE-2014-BT-STD-0058-0016. pp. 9-14, 9-15.
[17] Ibid. p. 9-16.