



**PLUMBING-HEATING-COOLING
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May 16, 2022

Ms. Julia Hegarty
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-5B
1000 Independence Avenue SW
Washington, D.C. 20585-0121

Re: Preliminary Technical Support Document for Consumer Water Heaters, Docket Number EERE-2017-BT-STD-0019

The Plumbing-Heating-Cooling Contractors—National Association (PHCC) is the oldest construction trades association in the country representing approximately 3,200 plumbing and HVACR contractors employing over 64,000 professionals across the United States. Since 1883, this organization and its members have focused on the safe installation and maintenance of plumbing and HVAC systems.

PHCC is grateful for the opportunity to comment on the Preliminary Technical Support Document for Consumer Water Heaters (TSD). Members of this association have been a primary source for the installation of consumer water heaters for more than a hundred years. This makes the plumbing contractor the last point of contact with the consumer facing the realities of forced product changes in the marketplace. PHCC supports the use of energy efficient products when those products are technically feasible and economically justified.

The 844-page TSD was issued with a 60-day comment period and the Department subsequently extended the comment period an additional 14-days. This association does not operate on the scale of the federal government, resource and staffing limitations are a reality which have limited the depth of responses presented in this submission. It is understood that the Department is operating under a “time is of the essence” perspective but additional time could well have improved the TSD and the comments that will be submitted.

The values for products, materials, and labor used in the TSD do not seem to be aligned with the current market. Given the last two years of supply chain issues and labor shortages, the pricing seems to be greatly understated. Reviewing just one nationally noted online plumbing wholesale source, one finds the cost of various types of water heaters to be near or even exceed the TSD projected installed cost of water heaters. Checking many of the miscellaneous products listed in the TDS analysis shows those costs are understated as well (expansion tanks, water heater stands, relief valves, pipe and fittings, etc.) While some local wholesale distributors might sell for less or contractors buying in bulk may find better pricing, the current state of the distribution change has made the values listed in the TDS highly in doubt.



Similarly, the TSD indicates plumbers charge approximately \$64 per hour for residential work and \$89 for commercial work yet the Department's consultant uses \$60 per hour in the calculations. PHCC, constrained by anti-trust regulations, does not have contractor labor rates but it is the associations opinion that these values are very low. Further, PHCC notes that in several instances DOE relies on information from esteemed sources in the HVAC industry. While this association recognizes those organizations and values their resources, in general, they are not plumbing professionals. The methods and numbers may be similar but there are differences in the industries.

The Department discusses mark-ups and incremental mark-ups at length. PHCC does not believe that installation of water heaters are similar to LCD televisions or real estate commissions. Consumer electronics are a prime example of products continuing to go down in price, there is great retail pressure to be the lowest price. Real estate may also not be similar, in the last several years property sales have been booming and negotiation is a hallmark of that industry. If an agent should make concessions here and there, the current market will make up for the discount in volume of sales.

Water heater sales are not the same as consumer electronics or real estate. Product prices have risen due to material shortages and increased regulatory burden. In competitive bidding situations, mark-ups may be trimmed but for the typical replacement market people generally take the price of the serviceman who is ready to restore their hot water and perhaps stop a leak. There are limits to this, people frequently have a sense of what they are willing to pay but a quoted price in their ballpark will elicit a sale. Lastly, the consultant references that the construction industry is not more profitable now than it has been for decades This may be true in percentage terms but as costs have gone up, real dollars of profit have increased, many businesses (not just contractors) are making more money today.

The TSD contains numerous places where language is confusing, and verbiage refers to products other than water heaters. For example, page 7B-4 has a discussion of heat pump water heaters not operating when ambient temperatures are below 32°F or above 100°F, it is unclear what this means. The TSD infers that the majority of these products will be installed indoors. Does DOE expect indoor conditions to be in those extreme temperature ranges? Is this related to ducted air for the heat pump? It is unclear how many units are expected to have ducts or if those will have both supply and return or just exhaust. Strict reliance on exhaust will create additional infiltration in the structure, it is unclear if that is considered in the TSD.

The summation of this section indicates DOE believes heat pump water heaters will operate as resistance electric units 10 percent of the time. Given the meager recovery rate typical of heat pump water heaters and their poor performance with cold water below 50°F, it would seem logical that these products would rely on resistance heat for much more time, 30 or perhaps 40 percent of the time. This is an understated component in the operation of these products which needs further consideration.



Further discussion by the Department considers space constrained installations. This is an ongoing issue from the last change in product efficiency. Consumers continue to have to make choices as to how to accommodate a replacement unit that will not fit in an existing space. It appears this situation is not going to get better. Given the significant portion of water heaters that are allocated to the replacement market (85% per DOE), this should be an overarching concern. Of the options listed, consumers likely will settle for a smaller capacity water heater rather than make extensive modifications to their buildings. In the case of switching from gas to electric resistance, a possible outcome, the additional electrical costs would add significantly to the installation cost.

Taller heaters will not fit in undercounter cabinets, rough-in piping locations or building elements may also prevent taller units. Higher capacity lower volume units are not typically available on a moment's notice, remember consumers want their hot water back asap. It is suggested that door frames be removed and re-installed to allow products to be installed. While that sounds like a good solution, it is against the plumbing code for most jurisdictions in the U.S. Structural elements or finished surfaces are not to be removed to service water heaters, this would include replacement of these products.

Lastly, it is suggested that smaller heaters can be installed with elevated storage temperatures, the use of a mixing valve can then reduce the water temperature. This is a costly and maintenance intensive solution and does not conserve energy. The plumbing industry has recognized this as a possibility, there is concern for inadvertent scalding situations with elevated temperatures. If this was a winning combination, it would be commonly done today.

When the topic turns to gas venting conditions, PHCC has long maintained that the conversion to condensing products is not always an acceptable option. There are challenging job conditions that add significant cost to accomplish and there are some instances where vent lengths could exceed the manufacturer's recommendation. DOE suggests that alternate methods exist or are in development. In the Department's words these have the "potential" to solve some issues. Contractors have heard this before; new technology will solve problems. After a few years and some system failures, these same contractors have to go back and fix problems. It would be preferable to have fully vetted proven technology in place before hanging hopes on this.

The confusion continues on page 8C-3, a footnote b (related to water heater market shares) talks all about fuel switching for furnaces or adding centralized heating systems, how does a furnace assumption apply to a water heater? On page 8C-14, in the Vent Resizing section, the second paragraph talks about two vent connectors, one for the water heater and one for the consumer water heater (one of these must be a NWGF?), the reader is left to wonder exactly what is meant. It is indicated that one of these is typically 3-inch pipe and the other 4 inch pipe, but which is which?

PHCC has additional concerns for numerous assumptions in the development of the LCC. It seems things are left out of new construction analysis. The TSD does not contemplate condensate pumps and electric outlets for certain water heaters, it is assumed that these would be



installed as part of the project. In reality, these should be included, if the builder did not anticipate these products they would be at additional cost, and, the calculation should be made against the baseline model. Voluntarily building with upgraded products is a choice, one that a consumer is not obligated to make.

Likewise, it is assumed that when changing to a heat pump water heater from an existing electric storage water heater, there would be drains located nearby. As such a condensate pump should not be included in the price structure. It is not a code requirement to have a drain near the water heater, many times this drain is not there. If there is a drain pan installed, it is not intended to routinely handle condensate water. The TSD expects the change to a heat pump to only add, on average, 1 hour of labor, that is too low. Additional handling, drain work, re-piping, and programming of controls will require additional time.

Again, PHCC does not track labor rates, but the DOE consultant uses labor rates lower than those stated by the Department. The materials included (or not included) seem somewhat random. 3 feet of pipe is allowed for hot and cold-water pipe drops, that is fine if the heater is located under the mains but what about branch piping to get to a location, that piping is part of the water heater installation. Similarly, 3 feet of gas pipe is allowed for the installation, the typical gas pipe is above the heater near the floor joists, it is likely 6 feet down to the heater and should include a valve and some fittings. Electrical requirements should be included, these are not necessarily envisioned by the builder or homeowner. There is no mention of seismic bracing as required in numerous jurisdictions.

The consultant mentions that all water meters have check valves which isolate residential water systems. This is not true, they do not all have check valves, but if they did, the water heater expansion tank would be a must. In many instances this expansion tank is indeed necessary. If it is present on a changeout of a water heater the expansion tank should also be replaced. This represents additional costs in the model.

There are numerous items of concern in the consultant's labor estimates. Installation time is lumped to a specific 2.08 hours with no breakdown for the various installation items, PHCC feels the time is low but cannot tell where. Direct vent installation shows less than a conventional system, apparently due to the vent material coming with the water heater but there are typically more operations to perform with these units, it is not apparent what the true costs are without the water heater included in these estimates.

The consultant includes a trip charge for service contractors, a fairly common industry practice. As noted, it should cover some travel and office overhead related to the job. Water heater installations additionally take some miscellaneous materials and some special tooling. These are legitimate job expenses as are costs for vehicles and fuel. There is no recognition of truck expenses in the model. The consultant does comment that tools and miscellaneous expenses should be covered by the trip charge as "a cost of doing business." That is not true and refutes the earlier (and accurate) explanation of the trip charge.



Finally, PHCC believes the consideration of water heater energy cost is in error. It appears from the analysis that all fuel costs will go up except electricity. That is hard to believe even if the power generation moves to total renewable energy. The investment in infrastructure alone would burden rate payers significantly for years into the future. Renewable systems will require maintenance and monitoring, there will be replacement and disposal costs, all of this to be paid by the user. If not paid through energy rates, these costs should still be allocated to the usage, this is not free and must be reconciled in a fair and equitable energy cost comparison. Electrical costs do not go down, if nothing else, demand will drive costs higher.

PHCC believes that the TSD, while well intended, does not accurately reflect the current economic conditions consumers face in 2022. If the analysis is revised with costs that reflect the true realities in the market, the result will have a higher degree of validity for the application of water heating products moving into the future.

PHCC again expresses its thanks for the opportunity to comment on the TSD and looks forward to future discussions on practical and affordable energy policies.
Respectfully submitted,

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