

## **Guidelines for Using the Billing Adjustment Feature in NEAT and MHEA**

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Both NEAT and MHEA provide a powerful tool to tailor the recommended list of measures based on the actual energy use of the house. By entering pre-retrofit utility billing information representative of the heating and/or cooling seasons and checking the “Billing Adjust” check box on the Audit Information form, NEAT and MHEA will adjust the estimated energy savings for each measure and provide a revised list of recommended measures that reflect this billed consumption. Tables for both “unadjusted” and “adjusted” recommendations are provided on the Recommended Measures report. A comparison of predicted and billed consumptions is provided on NEAT’s and MHEA’s Recommended Measures report as well.

Although the calculations involving the adjustments are somewhat complicated, the “adjusted” energy savings of most measures usually increase if the actual energy use of the house is greater than what NEAT or MHEA predicts, and the “adjusted” energy savings typically decrease if NEAT or MHEA over predicts the energy consumption of the house. The energy savings for all measures are recalculated, so some measures that were previously recommended may be dropped from the recommended list if their adjusted energy savings decreased, and some measures may be added to the recommended list if their adjusted energy savings increased. The energy savings for some measures may increase or decrease differently than initially expected because of the interaction that occurs among measures and the order in which the measures are ranked after adjustment.

The “Billing Adjust” check box and details on entering utility billing information are discussed in Sections 6.1 and 6.17 of the NEAT User Manual and Sections 6.1 and 6.13 of the MHEA User Manual. In addition, presentation of the billing data adjusted results in the Recommended Measures report is described in Section 7.6 of both the NEAT and MHEA User Manuals. For Version 8 of the Weatherization Assistant, it should be noted that when the “Billing Adjust” check box is selected, only the “adjusted” recommended measures are listed under the Measures tab on the main NEAT or MHEA form, so only these measure are available to automatically transfer to Work Orders.

Tailoring the recommended list of measures based on the actual energy use of the house is a powerful tool in both NEAT and MHEA because it can provide a reality check on the accuracy of NEAT’s and MHEA’s recommendations and improve the accuracy of the audits’ energy saving estimates and recommendations (at least in the short term). However, the following subtleties concerning how to enter utility data and interpret results should be understood before embarking on a full scale implementation of the tool:

- The actual energy use of the house reflects how the occupants operate their house and their individual lifestyles. Weatherizing the house based on the “adjusted” recommendations may lead to inequities among houses because of lifestyle differences among occupants. For example, occupants may keep the temperature low in their house or close off rooms during the winter because they can’t afford to pay their utility bill if they keep the temperature at a higher, more comfortable level or try to heat the entire house. The actual energy use of homes with such occupants will likely be less than what

NEAT or MHEA predicts, which can lead to fewer measures being recommended by NEAT or MHEA if the billing adjustment feature is used. Ironically, such houses essentially get penalized when they are perhaps in greater need of weatherization than houses with more typical occupants. Conversely, houses with occupants who keep their indoor temperature higher than typical in the winter can end up getting rewarded for having occupants with inefficient behavior. Weatherizing the house based on the “adjusted” recommendation can also lead to inaccurate estimates of energy savings in the long-term because of long-term lifestyle changes. For example, over the 15 to 20-year life of many of the major weatherization measures, 4-5 different sets of occupants might live in a house. The standard “unadjusted” recommendations made by NEAT and MHEA are based on typical occupant lifestyles that will occur on average over the long term rather than the short-term lifestyles of the current occupants. In summary, NEAT’s and MHEA’s “unadjusted” recommendations focus more on weatherizing the house for the long-term, while the “adjusted” recommendations have more of a short-term focus on the current occupants.

- Weatherizing the house based on the “adjusted” recommendations may also lead to inequities among houses because of the fuel they use. Natural gas and/or electricity utility bills can usually be entered into NEAT and MHEA for use with the billing adjustment feature, but fuel oil, propane, and even wood deliveries usually cannot because (1) only a few deliveries occur during a year in many houses, and (2) the amount of fuel delivered does not represent the amount of fuel consumed between delivery periods.
- Weatherizing the house based on the “adjusted” recommendations may lead to inequities among houses weatherized during different years because of weather differences. The “adjusted” recommendations are essentially based on just one-year of weather data (i.e., the weather data reflected in the pre-weatherization billing data) rather than long-term weather as used in NEAT and MHEA. Inequities may occur among houses weatherized from one year to the next if the weather for a particular year was warmer or cooler than normal.

Degree days corresponding to the utility billing data do not need to be entered into NEAT or MHEA to perform the utility billing adjustment. However, if entered, NEAT and MHEA compare in a table the degree days for the billing data entered and that assumed by NEAT and MHEA based on 30-year average weather. To possibly mitigate the weather inequity, the differences between degree days can be considered before selecting either the “adjusted” or “unadjusted” recommendations. For example, if the difference in degree days is about the same as the difference in energy use (e.g., NEAT or MHEA over predict the energy use of the house by 20% but the degree days used by NEAT or MHEA are 20% greater than the degree days corresponding to the billing data), then NEAT and MHEA’s “unadjusted” recommendations should perhaps be used because the “adjusted” recommendations are reflecting just degree day differences and are being based essentially on weather that occurred for one particular year which may have been unusually warm or cold rather than the long-term weather for the house location. If the

degree day difference is about half the difference in energy use (e.g., NEAT or MHEA over predict the energy use of the house by 20% but the degree days used by NEAT or MHEA are only 10% greater than the degree days corresponding to the billing data), then the “adjusted” and “unadjusted” recommendations should perhaps be considered side-by-side since both may be “equally” correct.

- A full winter or summer of utility bills should be entered before the “adjusted” recommendations are relied on. Adjustments based on just one or two months of billing data can be misleading because the limited months of billing data may not adequately represent the full winter or summer.
- Houses heated by natural gas or electricity may be using supplemental fuels and heating systems (e.g., wood stoves or fireplaces, portable kerosene heaters, and portable electric heaters in homes heated by natural gas). The use of supplemental heating may be the reason for all or some of NEAT’s or MHEA’s over prediction of the actual energy use of the house since these supplemental fuels are not included in the utility billing data. If NEAT’s or MHEA’s over prediction of the actual energy use of the house cannot be explained by differences in degree days, then the possibility that supplemental fuels are being used should be considered before using the “adjusted” recommendations directly or in combination with the “unadjusted” recommendations.
- In houses heated by electricity that also have air conditioners installed, it is often difficult to estimate the base load electricity use of the house because heating or cooling (or both) occurs in all 12 months (i.e., there are no months when neither heating or cooling occurs). In entering the bills for the heating season, do not enter 12 months of bills as you might with natural gas because all of the electric use that remains after subtracting off the base load use will be considered to be for heating, even that which occurs in the summer months. For the heating season, typically enter billing data that cover/represent the months of October to April and any months in which only baseload use occurred (i.e., no heating or cooling occurred). Similarly for entering the bills for the cooling season. For the cooling season, typically enter billing data that cover/represent the months of June, July, August, and September and again any months in which only baseload use occurred.