



State of Ohio
Weatherization Program
Standards

Section	DIAGNOSTIC TESTING METHODS
Subject	Procedures for Measuring Electricity

*PROCEDURES FOR MEASURING ELECTRICITY/
PROCEDURES FOR DETERMINING COST-
EFFECTIVENESS 1506-6*

Use a commercially available kilowatt-hour meter to measure electricity use of refrigerators, well water pumps, etc. Record the date and time period for the meter reading period. Account for seasonal operating characteristics of appliances. For instance, many waterbed heaters are not on in the summer time, so usage would be underestimated.

testing equipment
1506-6.1



Use the following method to calculate savings based on metering of energy consumption.

**metered savings
calculations**
1506-6.2



Determine the pre-retrofit energy consumption.

**pre-retrofit
consumption**
1506-6.2a



- i. Determine existing wattage by taking meter reading (W_{pre}).
- ii. Determine the hours of use (H_{pre}).
- iii. Determine the number of days of use per year (Y_{pre}).
- iv. Multiply $W_{pre} \times H_{pre} \times Y_{pre}$ and divide by 1,000 to calculate pre-retrofit kWh use (kWh_{pre}).

Determine the post-retrofit energy consumption.

**post-retrofit
consumption**
1506-6.2.b



- i. Determine the new wattage (W_{post}).
- ii. Determine the hours of use (H_{post}).
- iii. Determine the number of days of use per year (Y_{post}).
- iv. Multiply $W_{post} \times H_{post} \times Y_{post}$ and divide by 1,000 to calculate pre-retrofit kWh use (kWh_{post}).

Or use the information on the DOE energy guide label to determine consumption for replacement appliances (kWh_{post}).

Determine annual energy savings from the measure (S_a).

annual savings
1506-6.2.c



- i. $S_a = kWh_{post} - kWh_{pre}$.

NEAT input
1506-6.2d



Convert annual energy savings to Mbtu for input into NEAT (Mbtu).



- i. $Mbtu = (S_a \times 3412 \text{ btu/kWh})/1,000,000$.
- ii. Input Mbtu into the NEAT audit, along with the fuel type saved and the life of the measure. Include the measure in the SIR calculations on the last NEAT input screen.

non-metered savings calculation
1506-6.3



Use the following method to calculate electricity savings if a kilowatt-hour meter is not used:

pre-retrofit consumption
1506-6.3a



Determine the pre-retrofit energy consumption.

- i. Determine existing wattage (W_{pre}).
- ii. Determine the hours of use (H_{pre}).
- iii. Determine the number of days of use per year (Y_{pre}).
- iv. Multiply $W_{pre} \times H_{pre} \times Y_{pre}$ and divide by 1,000 to calculate pre-retrofit kWh use (kWh_{pre}).

post-retrofit consumption
1506-6.3b



Determine the post-retrofit energy consumption.

- i. Determine the new wattage (W_{post}).
- ii. Determine the hours of use (H_{post}).
- iii. Determine the number of days of use per year (Y_{post}).
- iv. Multiply $W_{post} \times H_{post} \times Y_{post}$ and divide by 1,000 to calculate pre-retrofit kWh use (kWh_{post}).

annual savings
1506-6.3c



Determine annual energy savings from the measure (S_a).

- i. $S_a = kWh_{post} - kWh_{pre}$.

NEAT input
1506-6.3d



Convert annual energy savings to Mbtu for input into NEAT (Mbtu).



- i. $Mbtu = (S_a \times 3412 \text{ btu/kWh})/1,000,000$.
- ii. Input Mbtu into the NEAT audit, along with the fuel type saved and the life of the measure. Include the measure in the SIR calculations on the last NEAT input screen.

The provider/grantee/contractor must collect the following data for the analysis:

- cost of electricity in dollars and cents per kWh
- 2 hour metered electric usage of old appliance
- DOE Energy Guide listing of annual usage of the proposed new appliance
- Cost of the proposed new appliance

mandatory data for appliance replacement

1506-6.4a



Select the table from Appendix A for the DOE Energy Guide annual kWh usage of the new appliance. For those appliances with annual usage between the listed annual usages, select the table of the next highest annual usage.

using the table

1506-6.4b



Select the kWh/day number that matches the metered usage of the old unit. For those readings that fall between the listed readings, select the next lowest reading from the table.

Follow that row across to the column closest to the electric rate (energy cost in cents per kWh) of the utility serving the house.

The dollars listed in the table represent the threshold cost of a replacement unit with an SIR of 1. All replacements that cost *less* than the cost listed in the table have an SIR greater than 1 and may be replaced. All replacements that cost *more* than the cost listed in the table have an SIR less than 1 and may not be replaced.

Collect the following information:

- cost of electricity in dollars and cents per kWh
- hours of use for each existing lamp
- proposed wattage of each new lamp
- cost of each new lamp

mandatory data for lighting replacement

1506-6.5a



Select the table for the wattage of the old lamp. For those lamps with wattage between the listed wattages, select the table of the next lowest usage.

using the table

1506-6.5b



Select the wattage that matches the proposed replacement (CFL Watts). For those readings that fall between the listed wattages, select the next highest reading from the table.

Select the row corresponding to the daily usage (Hours on per day) for the lamp.

Follow that row across to the column closest to the electric rate (energy cost in cents per kWh) of the utility serving the house.

The dollars listed in the table represent the threshold cost of a replacement unit with an SIR of 1. All replacements that cost *less* than the cost listed in the table have an SIR greater than 1 and may be replaced. All replacements that cost *more* than the cost listed in the table have an SIR less than 1 and may not be replaced.