

4.2 COMMERCIAL AND RESIDENTIAL HVAC SPLIT-SYSTEMS WITHOUT AHRI CERTIFICATION

This section provides guidance in determining efficiency levels of eligible HVAC split systems that do not have AHRI certification. The methodology outlined in this memo can be used starting in PY2023.

Constructing AC and heat pump systems can be done using outdoor units and indoor units from different manufacturers; not all these combinations are certified by AHRI. Savings should be calculated and reported consistently across utilities and in agreement with industry-standard practice and the Energy Efficiency Rule 16 TAC § 25.181.

Projects in PY2020 were affected by changes in supply chains due to COVID-19, leading to project equipment and timeline adjustments; supply chain issues are expected to continue into PY2023. In addition to the AHRI certification, the process outlined in this guidance memo may guide HVAC project efficiency calculations impacted by supply chain issues. Coordination with the evaluation team for alternate applications of the process is recommended.

4.2.1 Background

Texas TRM 10.0 allows air conditioning and heat pump split systems to be either AHRI-certified or listed on the DOE Compliance Certification Management System (CCMS). Split systems consist of an outdoor unit and an indoor unit, which can be made by the same manufacturer or separate manufacturers. The system's efficiency and size are driven primarily by the outdoor unit, although various indoor units can slightly affect the system efficiency.

Texas TRM 10.0 clarifies the allowable efficiency levels for outdoor and indoor unit pairs listed in the DOE CCMS and not AHRI-certified. The TRM states that the claimed efficiency for these non-certified pairs should not exceed the AHRI-certified pairs' average. The guidance below provides an example to identify the not-to-exceed value.

4.2.2 Guidance

The following guidance should be applied if paired outdoor and indoor HVAC units are not in the AHRI certification list and only have DOE CCMS testing results. In that case, the high-efficient condition's capacity and efficiency shall not exceed the average of the AHRI-certified pair listing for the matching outdoor (condenser) unit. The DOE CCMS listing provides documentation of the results that are on the AHRI certification listing and can be downloaded and filtered based on listings that use a similar condenser and various indoor units.

The following is an example scenario designed to direct the user on interpreting the guidance in this memo.

Example: A split system is listed in DOE CCMS and is not AHRI certified.

Analysis scenario: A high-efficiency split-system heat pump is installed with a Goodman GSZ16 outdoor unit (condenser) and a third-party indoor unit (air handler). The specific pair is not listed in the AHRI database.

Step 1: Access the DOE CCMS⁷ and select the appropriate measure category for the product pair. In this example, it is the *Air Conditioners and Heat Pump – Central* measure category.⁸ Search for the critical component to the system's efficiency (the outdoor unit (condenser)), with model number GSZ160241B*. The * is added near the end of the model number to allow for different condenser unit variations.

Step 2: Identify the specific air handler match and record the specifications from the DOE CCMS. In this example, the Airmark GES244 indoor unit pairs with the Goodman GSZ160241B outdoor unit with the following specifications:

Table 5. Specification of an Example Split System

Cooling capacity (Btu/h)	24,000
Heating capacity (Btu/h)	24,000
SEER	16
EER	13
HSPF	9
Link to FTC Energy Guide label	(blank)*

*(blank) indicates the pair is not listed in the AHRI database.

The *Link to FTC Energy Guide label* column will identify other certifications obtained by this equipment pair. In the example, the column is blank, indicating it is not listed in the AHRI database.

Step 3: Filter the DOE CCMS database to match the specification of the installed pair. Filter the *product code description*, *cooling capacity*, and *Link to FTC Energy Guide Label* to find a representative sample of similar AHRI-listed units. Table 6 details the filter selected for the example. Figure 1 shows the filter on the CCMS database interface.

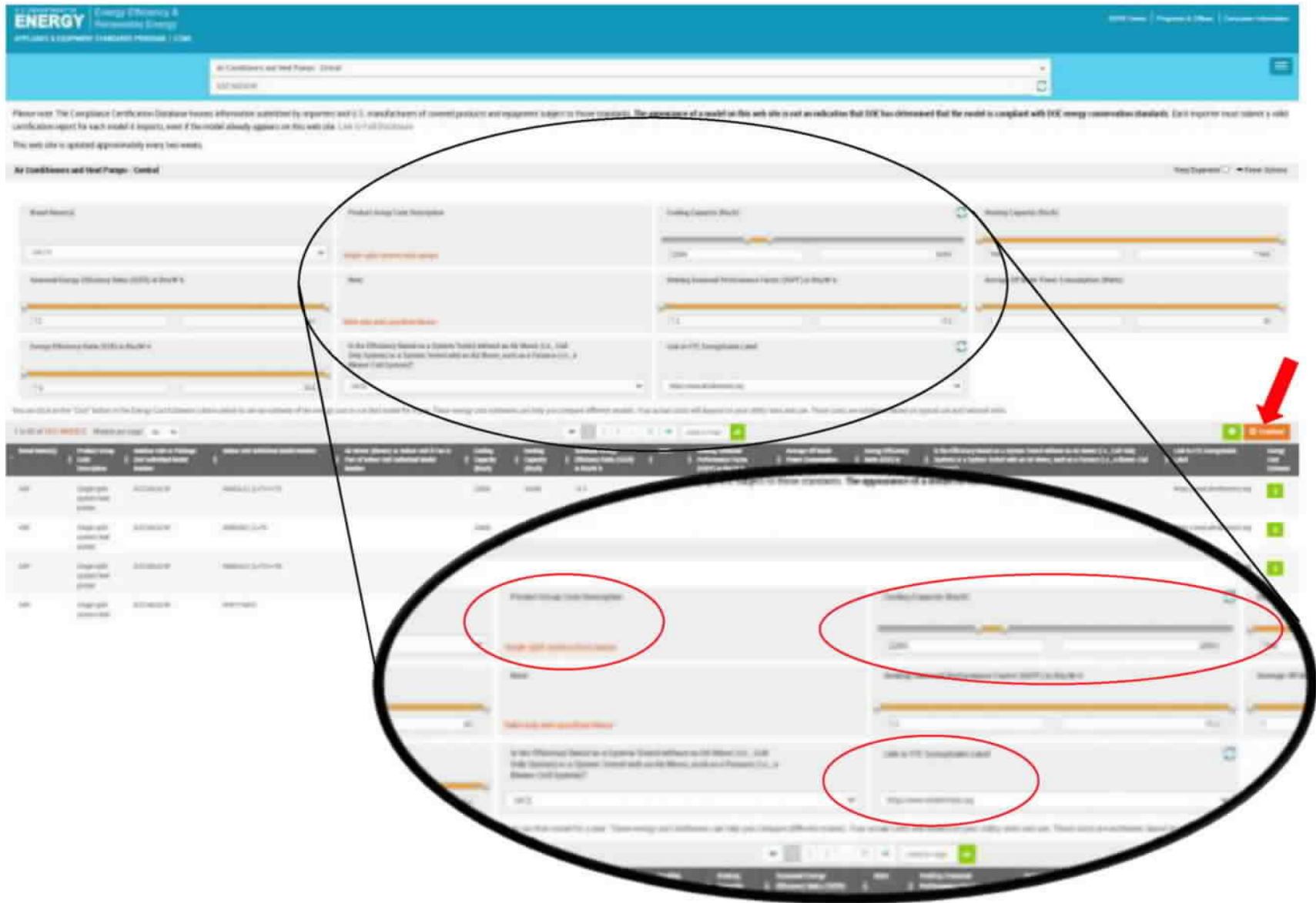
Table 6. Example DOE CCMS Filter to Similar Equipment

Product code description	Single-split-system-heat-pump
Cooling capacity	22,500 to 26,500
Link to FTC Energy Guide Label	www.ahridirectory.org

⁷ DOE Compliance Certification Database. https://www.regulations.doe.gov/certification-data/#q=Product_Group_s%3A*

⁸ Note that the measure categories are based on technology and not use. The example is for a split system, but the category in the database is central system because the condenser technology meets that definition.

Figure 1. Example Filter of DOE CCMS Database



Step 4: Download the filtered database using the *download* button on the right side of the screen. A .csv spreadsheet will download. Project documentation should include a copy of the downloaded .csv file with the download date in the file name. Since the DOE CCMS is constantly updated, this file is the record of the DOE CCMS entries on the date of application review.

Figure 2 below shows the downloaded spreadsheet with three rows added above. Rows 2 and 3 identify the filters and the performance metric columns. Column C is the filter for the outdoor unit in Step 1. Columns G and Q (not shown) are the filters applied in Step 3.

Columns I, K, and M contain the performance metrics for the filtered products and represent the AHRI-certified performance metrics for similar split-system pairs with the matching outdoor unit (condenser).

Figure 2. Sample Downloaded Spreadsheet with Calculation

Brand Name	Product Group	Basic Model Num1	Outdoor Unit	Indoor Unit	Int Air Move	Cooling Capacity	Heating Capacity	Seasonal Energy Note	SEER	HSPF	EER		
								Average =	15.20918	Average =	8.61169	Average =	12.56307
		Filter to Outdoor Unit Model					Filter to Approx Size Range		Performance Metric		Performance Metric		
		Condenser Model					Cooling Capacity		SEER		HSPF		
DAIKIN	Single-split-eyr	G521602418*	D2165A02418*	C5CF808A6D**	D*80VC08	23000	23200	15 Valid only w/	8.5	13	12.5 Blow		
DAIKIN	Single-split-eyr	G521602418*	D2165A02418*	CA*F3636*8D**	D*80VC08	23000	23200	15 Valid only w/	8.5	13	12.5 Blow		
DAIKIN	Single-split-eyr	G521602418*	D2165A02418*	C5CF808A6D**	D*80VC08	23000	23000	14.5 Valid only w/	8.2	13	12.2 Blow		
DAIKIN	Single-split-eyr	G521602418*	D2165A02418*	CHFF36368C**	D*80VC08	23000	23400	15 Valid only w/	8.5	13	12.5 Blow		
DAIKIN	Single-split-eyr	G521602418*	D2165A02418*	CHFF36368C**	D*80VC06	23000	23400	15 Valid only w/	8.5	13	12.5 Blow		
DAIKIN	Single-split-eyr	G521602418*	D2165A02418*	CA*F3636*8D**	D*80VC06	23000	23200	15 Valid only w/	8.5	13	12.5 Blow		
DAIKIN	Single-split-eyr	G521602418*	D2165A02418*	CA*F3117*6A**	D*80VC06	23400	23600	16 Valid only w/	9	13	13 Blow		
GOODMAN	Single-split-eyr	G521602418*	G521602418*	CA*F3117*6A**	A*VM9700	23400	23600	16 Valid only w/	9	13	13 Blow		
FRANKLIN	Single-split-eyr	G521602418*	G521602418*	CA*F3636*8D**	A*VM9700	23000	23200	15 Valid only w/	8.5	13	12.5 Blow		
ENERGI AIR	Single-split-eyr	G521602418*	G521602418*	CA*F3636*8D**	A*VM9700	23000	23200	15 Valid only w/	8.5	13	12.5 Blow		

Column I, K, and M are the DOE CCMS logged values of SEER, HSPF, and EER, respectively. Row 1 uses the =Average() function in Microsoft Excel to identify the average performance metrics from the data in the database. Record these values rounded to one decimal point.

Table 7. Average Performance Metrics of Similar Certified Units

SEER (AHRI average)	15.2
EER (AHRI average)	12.6
HSPF (AHRI average)	8.6

Step 5: Identify the performance metrics used for TRM energy efficiency calculations. The installed unit pair's performance metrics for the calculation shall not exceed the similar-sized unit pair's performance metrics in the AHRI database.

Table 8. TRM Calculation Performance Metrics Determination

Performance metric	DOE CCMS (actual)	AHRI certification average	TRM calculation value⁹
SEER	16	15.2	15
EER	13	12.6	12.5
HSPF	9	8.6	8.6

Step 6: Complete the TRM energy savings calculation using the TRM calculation values determined in Table 8.

Include (1) the additional documentation of the original downloaded .csv file and (2) the average efficiency calculation spreadsheet file with the project documentation required in TRM Volume 2 and Volume 3.

⁹ TRM calculation was determined using the rounding for EER and HSPF values to matched deemed tables. If the calculator can handle more detail, using the values rounded to the nearest tenth is acceptable.

4.3 DATA MODEL

With the goal of easing the interpretation of the TRM by database and tracking system developers, the EM&V team worked with EUMMOT and Texas eTRM providers (i.e., Frontier Energy, ANB Systems) to develop a standard data model that outlines common data collected for each prescriptive measure. The data model is for all residential measures in Volume 2 and a variety of commercial measures in Volume 3, which are not already utilizing savings calculators.

For example, the current data model for an ENERGY STAR® clothes dryer includes weather zone, unit type (front-loading, top-loading, compact), capacity (standard, compact), quantity installed, and date of purchase.

A benefit of a standard data model is to improve program and project analytics across service providers and implementers. A standard data model will also standardize project collection forms (e.g., on-site inspection forms) and reduce the time cleaning large data sets.

For more information, please contact an EUMMOT representative.

APPENDIX A: LOW-INCOME INCOME-ELIGIBLE VERIFICATION FORMS

**Single-Family (four or less units or owner-occupied)
Income Eligibility for Full-Incentive Energy Efficiency Services**

This statement is made to verify my household income eligibility. The Public Utility Commission of Texas has authorized energy efficiency programs to reduce the utility bills of income-eligible households. Contractors participating in the programs receive higher incentive payments when you are income-eligible. The purpose of the higher payment is to enable the contractor to provide the improvements at a very low cost or no cost to you. **Participating in this program will not affect your eligibility for other program benefits listed below.**

The information provided below will be used solely for the purpose of determining household eligibility and will be kept confidential by the investor-owned utility contractor or other representative and by the Public Utility Commission of Texas and their contractor. It will not be sold or provided to any other party.

Name		
Street Address		Apartment Number
City	State TX	Zip Code
Phone Number with Area Code		Number of Persons in Household

Category 1A: Eligible through other programs or services

At least one member of my household received benefits from one or more of the programs listed below (check all that applies, **digital or paper copy of proof of participation such as award letter required with this form**):

- | | |
|--|--|
| <input type="checkbox"/> Bureau of Indian Affairs (BIA) General Assistance | <input type="checkbox"/> Section 8 Housing Voucher |
| <input type="checkbox"/> Federal Public Housing Assistance (FPHA) | <input type="checkbox"/> Supplemental Nutrition Assistance Program (SNAP) (Food Stamps) |
| <input type="checkbox"/> Food Distribution Program on Indian Reservations (FDPIR) | <input type="checkbox"/> Supplemental Security Income (SSI) |
| <input type="checkbox"/> Health Benefit Coverage under Child Health Plan (CHIP) | <input type="checkbox"/> Temporary Assistance for Needy Families (TANF) |
| <input type="checkbox"/> Low-Income Energy Assistance Program (LIEAP) or Comprehensive Energy Assistance Program (CEAP) | <input type="checkbox"/> Texas Lifeline Discount |
| <input type="checkbox"/> Medicaid (includes CHIP) | <input type="checkbox"/> Tribal Head Start
(only households that meet the income-qualifying standard) |
| <input type="checkbox"/> Medicare, Qualified Beneficiary
- QMB (Qualified Medicare Beneficiary)
- SLMB (Specific Low-Income Medicare Beneficiary)
- QI (Qualified Individual Program)
- QDWI (Qualified Disabled & Working Individual Program) | <input type="checkbox"/> Tribal Temporary Assistance for Needy Families (Tribal TANF) |
| <input type="checkbox"/> National School Lunch Program—Free Lunch Program | <input type="checkbox"/> Veterans Pension Benefit or Survivors Pension Benefit |
| | <input type="checkbox"/> Veterans Pension or Survivors Benefit Programs |

Your signature is required on the last page of this form.

**Category 1B: Eligible through community action or social service agency
(COMPLETED BY UTILITY, COMMUNITY ACTION, OR SOCIAL SERVICE AGENCY)**

I certify the named household participates in one of the programs in Category 1A or other low-income program service (such as Weatherization Assistance), which our agency qualifies participation.

Agency Name	Contact Name	Contact Phone Number with Area Code
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**Category 1C: Eligible through geographic location
(COMPLETED BY UTILITY OR THEIR REPRESENTATIVE OR PROVIDER)**

(check box if applicable): Form is not required for geographical qualification as long as the relevant information is in the utility's tracking data (service address, geographic qualifier)

- Housing and Urban Development (HUD) Low-Income Housing-Qualified Census Tract or Block—GEO ID: _____

Single-Family (four or less units or owner-occupied)
Income Eligibility for Full-Incentive Energy Efficiency Services

- Category 2:** Eligible through income verification
(DO NOT COMPLETE IF 1A, 1B, OR 1C COMPLETED ABOVE)

To accurately determine your **household income**, you must include the income of all persons residing in your home from all sources. To determine the amount of income in each category, enter the amount(s) on the check or benefit statement. **Supporting documentation must be provided (all personal identifying information may be redacted except name and address).**

STEP 1: Fill out the Income Calculation table below.

Amounts listed are shown (check one): Annually Monthly Weekly

Income Calculation Table

Source of Income	Amount (\$)
Wages from full- or part-time employment as shown on a paystub or W-2 form	
Unemployment or worker's compensation	
Social security	
Retirement income	
Child support or alimony	
All other earnings	
Total household income (add the amount entered on each line to figure your total household income)	

STEP 2: Compare your total household income per week, month, or year to the amount shown in the table below for the number of persons in your household.

If your total household income is equal to or less than the amount shown in the table, you are income-eligible.

200 Percent of Health and Human Services (HHS) Poverty Guidelines

Size of family unit	Annual Income	Monthly Income	Weekly Income
1	\$30,120	\$2,510	\$579
2	\$40,880	\$3,407	\$786
3	\$51,640	\$4,303	\$993
4	\$62,400	\$5,200	\$1,200
5	\$73,160	\$6,097	\$1,407
6	\$83,920	\$6,993	\$1,614
7	\$94,680	\$7,890	\$1,821
8	\$105,440	\$8,787	\$2,028
Each additional person, add:	\$10,760	\$897	\$207

* **Notice:** Income ceilings are for February 1, 2024—January 31, 2025.
Annual updates are posted on <http://www.puc.texas.gov/industry/electric/forms/>

(Electronic) By typing my name below, I certify the above statements to be true and correct to the best of my knowledge, and that this information can be used for the purpose of processing my Single-Family Income Eligibility for Full-Incentive Energy Efficiency Services Form.

(Non-Electronic) If filling out the delineation by hand, please provide your original signature and date.

I understand that the information is subject to audit and investigation by the investor-owned utility or representative providing the program services.

Applicant Signature	Date
Contractor Signature	Date

Keep a copy of this form for your records.

**Multifamily Apartment Complex (five or more units)
Income Eligibility for Full-Incentive Energy Efficiency Services**

This form is to verify that at least 75 percent of the units are rented by income-eligible customers. The Public Utility Commission of Texas has authorized energy efficiency programs to reduce the utility bills of income-eligible tenant households. Contractors participating in the programs receive higher incentive payments when at least 75 percent of the tenants qualify as income-eligible. **One form must be filled out for each qualifying multifamily apartment complex.**

The information provided below will be used solely for the purpose of determining household eligibility and will be kept confidential by the investor-owned utility contractor or other representative and by the Public Utility Commission of Texas and their contractor. It will not be sold or provided to any other party.

Name of Applicant (Property Owner or Agent)		Name of Property Owner	
Name of Multifamily Apartment Complex		Number of Units in Complex	
Name of Management Company		Name of On-Site Property Manager	
Complex Street Address		Suite Number	
City		State TX	Zip Code
Property Owner or Agent's Phone Number with Area Code () -		Fax Number with Area Code () -	
Management Company's Phone Number with Area Code () -		Fax Number with Area Code () -	

Category 1A: Eligible through other programs or services

The multifamily apartment complex qualifies in one or more of the programs listed below (check all that apply, **digital or paper copy of proof of participation such as the land use restriction agreement required with this form**):

- | | |
|---|--|
| <input type="checkbox"/> Affordable Housing Disposition Program | <input type="checkbox"/> Project-Based Section 8 |
| <input type="checkbox"/> HOME Rental Housing Development | <input type="checkbox"/> Rural Rental Section 515 (FMHA) |
| <input type="checkbox"/> Low-Income Housing Tax Credit Program | <input type="checkbox"/> Section 811 Project Rental Assistance Program |
| <input type="checkbox"/> Multifamily Bond Program | <input type="checkbox"/> Texas Housing Trust Fund |
| <input type="checkbox"/> Public Housing Authority (Texas Housing Association) | <input type="checkbox"/> Other income-qualifying housing program |
- Program name: _____

Your signature is required on the last page of this form.

Category 1B: Eligible through community action or social service agency

(COMPLETED BY UTILITY, COMMUNITY ACTION, OR SOCIAL SERVICE AGENCY)

I certify the named multifamily complex or 75 percent or more of tenants participate in one of the programs in Category 1A or other low-income program service (such as LIHEAP/CEAP and Weatherization Assistance), which our agency qualifies participation.

Agency Name	Contact Name	Contact Phone Number with Area Code () -
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Category 1C: Eligible through geographic location

(COMPLETED BY UTILITY OR THEIR REPRESENTATIVE OR PROVIDER)

(check box if applicable); Form is not required for geographical qualification as long as the relevant information is in the utility's tracking data (service address, geographic qualifier).

- Housing and Urban Development (HUD) Low-Income Housing-Qualified Census Tract or Block—GEO ID: _____

Multifamily Apartment Complex (five or more units)
Income Eligibility for Full-Incentive Energy Efficiency Services

Category 2: Eligible through income verification
(DO NOT COMPLETE IF 1A, 1B, OR 1C COMPLETED ABOVE)

For an apartment complex to be eligible, at least 75 percent of the tenant household incomes before taxes are at or below 200 percent of the federal poverty guidelines.

STEP 1: Fill out the Apartment Complex Income Calculation Worksheet.
(Excel or hard copy must be included with this form)

To accurately determine tenant household income, you may use the tenant rental application showing the number of individuals residing in the unit and the household income dated from within the past 18 months. If the rental application does not show the required information or the information is over 18 months old, then the tenant(s) must complete the Single-Family Income Eligibility for Full-Incentive Energy Efficiency Services form. Supporting documentation for each unit must be available for utility audit.

STEP 2: Compare the tenant's total household income per week, month, or year to the amount shown in the table below for the number of persons residing in the unit.

If the total household income is equal to or less than the amount shown in the table, the unit is income-eligible for the full incentive. If the unit is not income-eligible, the unit is eligible for the residential incentive level.

200 Percent of Health and Human Services (HHS) Poverty Guidelines

Size of family unit	Annual income	Monthly income	Weekly income
1	\$30,120	\$2,510	\$579
2	\$40,880	\$3,407	\$786
3	\$51,640	\$4,303	\$993
4	\$62,400	\$5,200	\$1,200
5	\$73,160	\$6,097	\$1,407
6	\$83,920	\$6,993	\$1,614
7	\$94,680	\$7,890	\$1,821
8	\$105,440	\$8,787	\$2,028
Each additional person, add:	\$10,760	\$897	\$207

* Notice: Income ceilings are for February 1, 2024—January 31, 2025.
Annual updates are posted on <http://www.puc.texas.gov/industry/electric/forms/>

STEP 3: Fill out the Apartment Complex Income Calculation Summary below.

Apartment Complex Income Calculation Summary

Apartment complex income calculation summary	Number of units
Number of income-eligible units	
Number of non-income-eligible units, including vacant units	
Total number of units	
Percentage of income-eligible units (income-eligible units divided by the total number of units)	

STEP 4: If "percentage of income-eligible units" is 75 percent or higher, please certify the eligibility of the apartment complex with your signature below.

(Electronic) By typing my name below, I certify the above statements to be true and correct to the best of my knowledge and that this information can be used for the purpose of processing my Multifamily Apartment Complex Income Eligibility for Full-Incentive Energy Efficiency Services Form.

(Non-Electronic) If filling out the delineation by hand, please provide your original signature and date.

I understand that the information is subject to audit and investigation by the investor-owned utility or representative providing the program services.

Applcmt Signature (Property Owner or Agent)	Date
Contractor Signature	Date

Keep a copy of this form for your records.

The Apartment Complex Income Calculation Worksheet is posted on [Texas PUC Sharepoint](#).