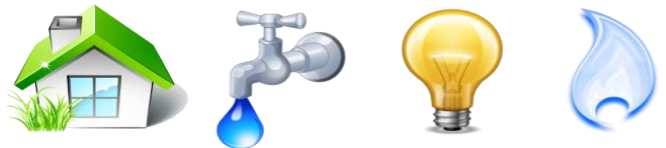


Utility Allowances

March 2022

FELIX TORRES FARM WORKER FAMILY HOUSING CENTER

Planada, California



INITIAL REPORT

USDA RURAL DEVELOPMENT

UTILITY ALLOWANCE SURVEY AND STUDY

(HOUSING AUTHORITY OF THE COUNTY OF MERCED)

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OBJECTIVES AND METHODOLOGY

OBJECTIVES AND METHODOLOGY

USDA RURAL DEVELOPMENT

Objective

The objective of this survey and study is to develop consumption and utility allowances for electricity and natural gas utilizing an approved engineering-based methodology for the **USDA Rural Development** property (**Felix Torres Farm Worker Family Housing Center**) for the **Housing Authority of the County of Merced, CA**. This analysis will be conducted by structure type and unit size, for tenant-paid utilities. This analysis includes **50 2 through 4-bedroom semi-detached/duplex units. Additionally, all of the units have energy efficient vinyl windows, insulation, and 100% LED lighting.** These allowances are based upon a reasonable consumption of an energy conservative family of modest circumstances and to provide for the basic essentials needed for a living environment that is safe, sanitary and healthful.

Methodology

The following steps were taken to accomplish the above objective.

1. Data Gathering

Specific information and characteristics about the Agency's 50 USDA dwelling units was collected from the Agency for the **Felix Torres Farm Worker Family Housing Center** property (See **Customization & Energy Efficient Measures for Base Ekotrope Models** form). Data gathered included, but is not limited to, building type, bedroom sizes, approximate age of development, fuel types, construction materials, window types, mechanicals, and energy efficiencies.

2. Create Customized Models

Energy engineering building structure models have been created by qualified licensed professionals for the ResidentLife Utility Allowances® software database. The Ekotrope software program utilized to develop these building structure models is HUD compliant. Sources for developing these models include: HUD Regulations 24 CFR Part 965, Subpart E, Resident Allowances for Utilities, Ekotrope™ Home Energy Rating software program, Energy Conservation for Housing...A Workbook – 1998, IECC (International Energy

Conservation Code) – 2000, Utility Allowance Guidebook – 2008, Calculating Consumptions and Utility Allowances – 1986, Mechanicals – 1992, and PIH Notice 90-8 T.D.C. For more information see Introduction to Ekotrope Software Program and Ekotrope Software Default Audit in Support Documentation section of this study.

Different models were created for each possible location and number of stories of the sample unit at the **Felix Torres Farm Worker Family Housing Center** (for example: inside unit, end unit, 1-story, 2-story, top floor, bottom floor, etc.). These models were then averaged together.

A ResidentLife Utility Allowances specialist analyzed the criteria provided by the Agency on the Questionnaire for Development of USDA Properties Utility Allowances and Customization & Energy Efficient Measures for Base Ekotrope Models forms. The specialist gathered the appropriate Ekotrope models and made any necessary adjustments.

3. Obtain Utility Rates and Charges

The following information was gathered by a rate specialist and input in the Utility Providers Residential Rates and Charges document:

- a. Documentation on current residential **electric** summer and winter rates and charges from **Pacific Gas and Electric** through their internet website and telephone inquiries.
- b. Documentation on current residential **natural gas** summer and winter rates and charges from **Pacific Gas and Electric** through their internet website

Tenants do not pay for water, sewer, or trash collection utilities/services.

4. Computation of Average Monthly Consumption

The following was performed by a utility allowance specialist to develop the utility allowances:

Electric and Natural Gas Consumptions

A utility allowance specialist exported and analyzed the reports generated by

the Ekotrope software program. These reports contain annual consumption usage for **electric and natural gas** utilities for the Felix Torres Farm Worker Family Housing Center, by building type, equipment fuel, and for applicable bedroom sizes. If the monthly average consumptions contained heating usage, these consumptions were climatically adjusted in the software program. Generated reports are provided in the Support Documentation section at the back of the study.

Next, the utility allowance specialist divided the annual usage provided in Ekotrope reports, wby 12-months to determine a monthly average usage. These monthly averages were entered into the **Monthly Utility Consumptions Totals** chart and into the **Cost of Consumption** calculation forms.

Tenants do not pay for water, sewer, and trash collection utilities/services.

5. *Computation of Utility Allowances*

The following process was conducted: **(See Cost of Consumptions)**

- a. **Pacific Gas and Electric's** current residential rates and charges for **electricity** usage (kwh) were applied to the adjusted monthly average consumption figures to determine an average cost of consumption for each size unit.
- b. **Pacific Gas and Electric's** current residential rates and charges for **natural gas** usage were applied to the adjusted monthly average consumption figures to determine cost of consumption for each size unit.

Tenants do not pay for water, sewer, or trash collection utilities/services.

See Chart 1 for Proposed USDA Monthly Utility Allowances found in the Survey and Study Results section of this report.

6. *Utility Allowance Schedule*

The Proposed Monthly Utility Allowances can be found in the Study Results section of this report.

7. Support Documentation

Per regulations 7 CFR 273.9, the Management must maintain methodologies used in developing and updating the allowances.

Also, 7 CFR 3560.202 (d) states that documentation to justify utility allowances must be maintained in the housing project file. Such record shall be available for inspection by compliance agencies.

This study report contains a copy of all such supporting documentation.

8. Annual Update

Per regulation 7 CFR 273.9, the Management must review its allowances annually and make adjustments to reflect changes in costs, rounded to the nearest whole number.

Per regulation 7 CFR 3560.202 (d), the allowances must be reviewed annually, adjusted for accuracy, and submit any utility allowance changes to the compliance agency for approval (see 7 CFR 3560.205).

SURVEY AND STUDY RESULTS

SURVEY AND STUDY RESULTS

USDA RURAL DEVELOPMENT

Utility Allowances were calculated utilizing an approved engineering method, Pacific Gas and Electric's current residential electric and natural gas utility rates and charges for the **Felix Torres Farm Worker Family Housing Center** property located in **Planada, CA**. The proposed monthly allowances are documented in the table on the following page.

Z:\2022\2022 Utility Allowances\2022 Agency Studies\ABC-Other Studies\Merced Co, CA-Felix Torres-USDA Initial\USDA Initial 2022\0200b-Felix Torres, CA-USDA INITIAL-Based Engineering (RLUA)-Survey Results.docx

ResidentLife Utility Allowances



HOUSING AUTHORITY OF THE COUNTY OF MERCED, CA

USDA Rural Housing

PROPOSED MONTHLY UTILITY ALLOWANCES

Chart 1

INITIAL 2022

Building Type: Semi-Detached/Duplex

Felix Torres Farm Worker Family Housing Center (EE Equip: Win-V,Ins,LED)	0BR	1BR	2BR	3BR	4BR	5BR
Electricity (L&A)			\$56.00	\$68.00	\$76.00	
Natural Gas (H,WH,C)			\$41.00	\$55.00	\$60.00	
Totals			\$97.00	\$123.00	\$136.00	

A monthly average cost of the summer and winter adjustments were used for the electric and natural gas costs.

L&A= Lights & Appliances

H= Space Heating

WH= Water Heating

C= Cooking

EE Equip= Energy Efficient Equipment

Win-V= Windows-Vinyl

Ins= Insulation

LED= 100% LED Lighting

Note: Public Housing utility allowances are calculated similar to the method used by each utility provider. These allowances are not calculated by end use (like Section 8 HCV), but by total usage for each utility type. Utility providers' monthly charges are included in the calculations.

MONTHLY CONSUMPTION TOTALS & BUILDING TYPE DESCRIPTIONS

HOUSING AUTHORITY OF THE COUNTY OF MERCED, CA

USDA Rural Housing

MONTHLY UTILITY CONSUMPTION TOTALS

Consumptions developed using an engineering method - 2022

Building Type: Semi-Detached/Duplex

Felix Torres Farm Worker Family Housing Center (EE Equip: Win-V,Ins,LED)	0BR	1BR	2BR	3BR	4BR	5BR
Electricity (kWh) S(L&A,A/C,F)			382	467	513	
Electricity (kWh) W(L&A,F)			251	295	334	
Natural Gas (ccfs) S(WH,C)			11	14	15	
Natural Gas (ccfs) W(H,WH,C)			48	60	65	

L&A= Lights & Appliances

A/C= Air Conditioning

H= Space Heating

WH= Water Heating

C= Cooking

F= Electric Fan for Gas Heating System

EE Equip= Energy Efficient Equipment

Win-Vinyl= Vinyl Windows

Ins= Insulation

LED= 100% LED Lighting

S= Summer

W= Winter

Summer: June - September (4), Winter: October - May (8)

Seasons based on PG&E's electric summer & winter months.

Summer: April - October (7), Winter: November - March (5)

Seasons based on PG&E's natural gas summer & winter months.

Building Type (Structure) Descriptions

1. **Apartment/Walk-Up/Condominium/Garden Apartment/Low-Rise/Flat (Apt)**

- a. Building with a group of 3 individual **units** with common walls; attached to other units; separate entrances, and may have common staircases.
- b. Each **building** may have an end unit, inside unit, top unit, bottom unit, etc. **Building** will have 2 or more stories.
- c. Usually, but not always, there will be units on both sides of building.

2. **High Rise Apartment (H-R)**

A multi-unit building; 5 or more stories; sharing one or more common entrances. May have an elevator.

3. **Row House/Townhouse/Triplex/Fourplex/Multiplex (RH)**

- a. An individual unit attached to other individual units; 2 or more common walls; separate ground level entrances; 1 or 2 story **units**.
- b. Each building will have end units and inside units.
- c. Fourplex units usually share 2 common walls; can be square-shaped or L-shaped.
- d. Triplex building can be V-shaped.

4. **Semi-Detached/Duplex (S-D or SD)**

Building with 2 individual housing units; with separate entrances; one common wall; 1 or 2 story units.

5. **Detached House (DH)**

A detached building intended to house one family; sits on its own piece of land; not attached to another dwelling.

UTILITY ALLOWANCE COST OF CONSUMPTION CALCULATIONS

HOUSING AUTHORITY OF THE COUNTY OF MERCED, CA

USDA Rural Housing

UTILITY ALLOWANCE COST OF CONSUMPTION CALCULATIONS

ELECTRICITY - Pacific Gas & Electric

INITIAL 2022

Felix Torres Farm Worker Family

Housing Center

Building Type: Semi-Detached/Duplex

Monthly Average Unit Consumption kWh for all bedroom types - Summer	0BR	1BR	2BR	3BR	4BR	5BR
			382	467	513	
Total Monthly Credit Per Month -\$4.26			-\$4.26	-\$4.26	-\$4.26	
Total Energy Charges (0-577) Per KWH 0.204999			\$78.31	\$95.73	\$105.16	
Total Monthly Cost - Summer			\$74.05	\$91.47	\$100.90	

Monthly Average Unit Consumption kWh for all bedroom types - Winter	0BR	1BR	2BR	3BR	4BR	5BR
			251	295	334	
Total Monthly Credit Per Month -\$4.26			-\$4.26	-\$4.26	-\$4.26	
Total Energy Charges (0-350) Per KWH 0.204999			\$51.45	\$60.47	\$68.47	
Total Monthly Cost - Winter			\$47.19	\$56.21	\$64.21	

Averaging Months	0BR	1BR	2BR	3BR	4BR	5BR
Summer Annual Avg 4			\$296.20	\$365.88	\$403.60	
Winter Annual Avg 8			\$377.52	\$449.68	\$513.68	
Total Monthly Cost (Based on Annual Average)			\$56.14	\$67.96	\$76.44	

Summer: June - September (4), Winter: October - May (8)

Seasons based on PG&E's electric summer & winter months.

HOUSING AUTHORITY OF THE COUNTY OF MERCED, CA

USDA Rural Housing

UTILITY ALLOWANCE COST OF CONSUMPTION CALCULATIONS

NATURAL GAS - Pacific Gas & Electric

INITIAL 2022

Felix Torres Farm Worker Family

Housing Center

Building Type: Semi-Detached/Duplex

Monthly Average Unit Consumption ccf for all bedroom types - Summer	0BR	1BR	2BR	3BR	4BR	5BR
			11	14	15	
California Climate Credit Per Month -\$2.05			-\$2.05	-\$2.05	-\$2.05	
Total Energy Charges (0-11) Per CCF 1.63378			\$17.97	\$17.97	\$17.97	
Total Energy Charges (over 11) Per CCF 2.00142				\$6.00	\$8.01	
Total Monthly Cost - Summer			\$15.92	\$21.92	\$23.93	

Monthly Average Unit Consumption ccf for all bedroom types - Winter	0BR	1BR	2BR	3BR	4BR	5BR
			48	60	65	
California Climate Credit Per Month -\$2.05			-\$2.05	-\$2.05	-\$2.05	
Total Energy Charges (0-48) Per CCF 1.63378			\$78.42	\$78.42	\$78.42	
Total Energy Charges (over 48) Per CCF 2.00142				\$24.02	\$34.02	
Total Monthly Cost - Winter			\$76.37	\$100.39	\$110.39	

Averaging Months	0BR	1BR	2BR	3BR	4BR	5BR
Summer Annual Avg 7			\$111.44	\$153.44	\$167.51	
Winter Annual Avg 5			\$381.85	\$501.95	\$551.95	
Total Monthly Cost (Based on Annual Average)			\$41.11	\$54.62	\$59.96	

Summer: April - October (7), Winter: November - March (5)

Seasons based on PG&E's natural gas summer & winter months.

SUPPORT DOCUMENTATION

UTILITY PROVIDER RATES AND CHARGES

HOUSING AUTHORITY OF THE COUNTY OF MERCED, CA
(Felix Torres Farm Worker Family Housing Center)
USDA Rural Housing

Utility Providers Residential Rates and Charges
As of March 2022

INITIAL 2022

ELECTRICITY

Source: Pacific Gas & Electric

800-743-5000

www.pge.com*

CARE - EL-1 - Territory R				
California Climate Credit	Per Month	-\$6.55	semi-annual credit of \$39.30)	
D-Care Discount (-34.944%)	Per Month	\$2.29		
Total Monthly Credit	Per Month	-\$4.26		
Tiers*	kwh per day	Tier-1	Tier-2	
Summer (June - September) (4)	18.6	0-577	578-2308	
Winter (October - May) (8)	11.3	0-350	351-1400	
Year Round Weighted Avg	13.7	0-425	426-1700	
Energy Charge*	Per KWH	0.31465	0.39454	
D-Care Discount (-34.944%)	Per KWH	-0.109951	-0.137868	
Energy Commission Tax	Per KWH	0.0003	0.0003	
Total Energy Charges	Per KWH	0.204999	0.256972	

NATURAL GAS

Source: Pacific Gas & Electric

800-743-5000

www.pge.com*

CARE - G-1 - Territory R				
California Climate Credit	Per Month	-\$2.05	(annual credit of \$24.62)	
Tiers*	therms per day	Tier-1	Tier-2	
Summer (April - October) (7)	0.36	0-11	over 11	
Winter Off-Peak (Nov, Feb, Mar) (3)	1.28	0-40	ove 40	
Winter On-Peak (Dec, Jan) (2)	1.97	0-61	over 61	
Winter Wtd Avg (Nov-March) (5)	1.56	0-48	over 48	
Year Round Weighted Avg	0.86	0-27	over 27	
Energy Charge*	Per Therm	1.56138	1.92902	
G-PPPS Surcharge	Per Therm	0.06215	0.06215	
G-SUR Surcharge	Per Therm	0.0044	0.0044	
CPUC Reimbursement Fee	Per Therm	0.00585	0.00585	
Total Energy Charges	Per Therm	1.63378	2.00142	

UTILITY PROVIDER DOCUMENTATION

Pacific Gas and Electric Company
Residential Time-of-Use Electric Rates
(E1,EM,ES,ET,E6,EM-TOU, EV,EV2,ETOU,ETOU,ETOU)

Rates Effective:
March 1, 2022, to Present

Rate Schedule	Rate Design	Delivery Minimum Bill Amount ^{1/} (\$ per meter per day)	Discount (\$ per dwelling unit per day)	Minimum Average Rate Limiter (\$ per kWh per month)	Energy Charge ^{2/} (\$/kWh)			D-CARE ^{3/} Line-Item Discount for California Alternate Rates for Energy (CARE) Customers	California Climate Credit ^{4/} (April & Oct Bill)	"Average" Bundled Total Rate ^{5/} (\$ per kWh)
			ES, ET Only	ES, ET Only	Baseline Usage ^{6/}	101% - 400% of Baseline	High Usage Over 400% of Baseline			
Residential Schedules: E-1, EM, ES, ESR, ET	Tiered Energy Charges	\$0.34810	ES = \$0.02858 ET = \$0.11466	\$0.04892	\$0.31465	\$0.39454	\$0.49318	-34.944%	(\$39.30)	\$0.33565
Rate Schedule	Rate Design	Delivery Minimum Bill Amount ^{1/} (\$ per meter per day)	Total Meter Charge Rate ^{7/} (\$ per meter per day)	Season	Time-of-Use Period	Energy Charge ^{2/} (\$/kWh)		D-CARE ^{3/} Line-Item Discount for California Alternate Rates for Energy (CARE) Customers	California Climate Credit ^{4/} (April & Oct Bill)	"Average" Total Rate ^{5/} (\$ per kWh)
						Baseline Usage ^{4/}	Over 100% of Baseline			
Residential Time-of-Use Rate Schedule E-6 and Rate Schedule EM-TOU	Time-of-Use Winter and Summer Peak, Part-Peak, and Off-Peak Energy Charges	\$0.34810	\$0.25298	Summer	Peak Part-Peak Off-Peak	\$0.41896 \$0.37375 \$0.29686	\$0.50914 \$0.46393 \$0.38704	-34.944%	(\$39.30)	\$0.33565
				Winter	Part-Peak Off-Peak	\$0.29804 \$0.28719	\$0.38822 \$0.37737			
Rate Schedule	Rate Design	Delivery Minimum Bill Amount ^{1/} (\$ per meter per day)	Total Meter Charge Rate ^{7/} (\$ per meter per day)	Season	Time-of-Use Period	Energy Charge ^{2/} (\$/kWh) (No Tiers)		D-CARE ^{3/} Line-Item Discount for California Alternate Rates for Energy (CARE) Customers	California Climate Credit ^{4/} (April & Oct Bill)	"Average" Total Rate ^{5/} (per kWh)
Residential Time-of-Use Service for Plug-In Electric Vehicle, Rate Schedule EV, Rate A ^{8/}	Time-of-Use Winter and Summer Peak, Part-Peak, and Off-Peak Energy Charges	\$0.34810	-	Summer	Peak Part-Peak Off-Peak	\$0.60355 \$0.35944 \$0.24689	-	-	(\$39.30)	-
				Winter	Peak Part-Peak Off-Peak	\$0.42148 \$0.28947 \$0.21774	-			
Residential Time-of-Use Service for Plug-In Electric Vehicle, Rate Schedule EV, Rate B ^{8/}	Time-of-Use Winter and Summer Peak, Part-Peak, and Off-Peak Energy Charges	-	\$0.04928	Summer	Peak Part-Peak Off-Peak	\$0.60057 \$0.35646 \$0.24391	-	-	-	-
				Winter	Peak Part-Peak Off-Peak	\$0.41855 \$0.28654 \$0.21481	-			
Residential Time-of-Use Service for Plug-In Electric Vehicle, Rate Schedule EV2	Time-of-Use Winter and Summer Peak, Part-Peak, and Off-Peak Energy Charges	\$0.34810	-	Summer	Peak Part-Peak Off-Peak	\$0.55731 \$0.44682 \$0.24480	-	-34.944%	(\$39.30)	-
				Winter	Peak Part-Peak Off-Peak	\$0.43020 \$0.41350 \$0.24480	-			
Rate Schedule	Rate Design	Delivery Minimum Bill Amount ^{1/} (\$ per meter per day)	Total Meter Charge Rate ^{7/} (\$ per meter per day)	Season	Time-of-Use Period	Energy Charge ^{2/} (\$/kWh)		D-CARE ^{3/} Line-Item Discount for California Alternate Rates for Energy (CARE) Customers	California Climate Credit ^{4/} (April & Oct Bill)	"Average" Total Rate ^{5/} (per kWh)
						Total Usage	Baseline Credit (Applied to Baseline Usage Only)			
Residential Time-of-Use Rate Schedule E-TOU-B ^{10/} (4-9 p.m.)	Time-of-Day Winter and Summer Peak and Off-Peak Energy Charges	\$0.34810	-	Summer	Peak Off-Peak	\$0.49052 \$0.36746	- -	-34.944%	(\$39.30)	-
				Winter	Peak Off-Peak	\$0.35390 \$0.31510	- -			
Residential Time-of-Use Rate Schedule E-TOU-C (Peak Pricing 4 - 9 p.m. Every Day)	Time-of-Use Winter and Summer Peak and Off-Peak Energy Charges	\$0.34810	-	Summer	Peak Off-Peak	\$0.48814 \$0.42470	(\$0.09018) (\$0.09018)	-34.944%	(\$39.30)	-
				Winter	Peak Off-Peak	\$0.39106 \$0.37373	(\$0.09018) (\$0.09018)			
Residential Time-of-Use NEW Rate Schedule E-TOU-D ^{9/} (Peak Pricing 5 - 8 p.m. Non-Holiday Weekdays)	Time-of-Use Winter and Summer Peak and Off-Peak Energy Charges	\$0.34810	-	Summer	Peak Off-Peak	\$0.47208 \$0.33712	- -	-34.944%	(\$39.30)	-
				Winter	Peak Off-Peak	\$0.38248 \$0.34387	- -			

^{1/} Customers will receive a 50% discount on the delivery minimum bill amount, if applicable. See Electric Schedule D-CARE for further details.

^{2/} See Actual Tariff for details on possible medical baseline allowances.

^{3/} Customers will receive a 34.954 percent discount on their total bundled charges on their otherwise applicable rate schedule (except CA Climate Credit). See Electric Schedule D-CARE for further details.

^{4/} Residential bill credit per household, per semi-annual payment occurring in the April and October bill cycles.

^{5/} Average bundled rates based on estimated forecast. Average rates provided only for general reference, and individual customer's average rate will depend on its applicable kWh, and TOU data.

^{6/} For Baseline Territory and Quantity information, please view second tab in this file, additional online table or rate schedule in Online Tariff Book.

^{7/} In addition to the Delivery Minimum Bill Amount.

^{8/} Summer Season: May-Oct Winter Season: Nov-Apr

^{9/} New Schedule, effective May 1, 2020, see tariff and Advice Letter 5661-E-B, for further details.

^{10/} E-TOU Option A was discontinued December 31, 2020 (see AL#4805-E-A). This Schedule renamed to E-TOU-B effective January 1, 2021.

NOTE - Change of Seasons (unless otherwise noted): **Summer** Season: June-September **Winter** Season: October-May



ELECTRIC PRELIMINARY STATEMENT PART K
ENERGY COMMISSION TAX

Sheet 1

K. ENERGY COMMISSION TAX:

The California legislature established the Energy Commission tax in 1975. The State Board of Equalization administers the tax, pursuant to current Sections 40001 et seq., of the Revenue and Taxation Code of the State of California. The tax provides additional funding for the California Energy Commission.

PG&E is required to collect the Energy Resources Surcharge Tax pursuant to Part 19 of Division 2 of the California Revenue and Taxation Code. The tax will be stated as a separate item on the billing statement. It is currently fixed at \$0.00030 per kilowatthour. This tax rate is subject to revision from time to time by the Energy Commission, subject to a statutory maximum. The tax does not apply to the federal government and certain other agencies as described in the above section of the Revenue and Taxation Code.

(T)

Residential ELECTRIC

Baseline Territories and Quantities

Effective January 1, 2021 - Present

(Change of Winter and Summer Seasonal Time Periods)

Winter**

(Effective January 1, 2021)

TERRITORY	INDIVIDUALLY METERED (E-6 and CARE)	MASTER METERED (EM-TOU and CARE)
ALL-ELEC. (Code H)	Daily ^{1/}	Daily ^{1/}
P	27.4	14.7
Q	27.4	14.7
R	28.1	13.6
S	24.9	13.1
T	13.6	9.0
V	16.9	11.2
W	20.0	11.8
X	15.4	12.9
Y	25.3	14.4
Z	16.5	9.4
BASIC ELEC. (Code B)	Daily ^{1/}	Daily ^{1/}
P	12.0	5.2
Q	12.0	5.2
R	11.3	5.2
S	11.1	5.2
T	8.2	4.5
V	8.8	5.0
W	10.7	5.3
X	10.5	5.9
Y	12.1	8.3
Z	8.1	5.6

^{1/}kWh per day

Summer Season: **June-Sept - Changed

***Winter Season: **Oct-May - Changed**

Advice Letter 6004-E-C, New Baseline Quantities and Season Changes for E-6 and EM-TOU Only

Summer**

(Effective June 1, 2021)

TERRITORY	INDIVIDUALLY METERED (E-6 and CARE)	MASTER METERED (EM-TOU and CARE)
ALL-ELEC. (Code H)	Daily ^{1/}	Daily ^{1/}
P	16.0	8.8
Q	8.9	7.3
R	20.9	9.6
S	18.7	9.8
T	7.5	5.1
V	10.9	6.3
W	23.6	11.7
X	8.9	7.3
Y	12.6	7.1
Z	7.0	4.0
BASIC ELEC. (Code B)	Daily ^{1/}	Daily ^{1/}
P	14.2	4.8
Q	10.3	5.4
R	18.6	7.9
S	15.8	6.7
T	6.8	3.8
V	7.5	4.2
W	20.2	8.2
X	10.3	5.4
Y	11.0	8.0
Z	6.2	4.5

Pacific Gas and Electric Company

[illegible]

Unless otherwise noted

/ Effective July 1, 2005, the Transportation Charge will be no less than the Minimum Transportation Charge of \$0.13151 (per day). Applicable to Rate Schedule G-1 only and does not apply to submetered tenants of master-metered customers served under gas Rate Schedule GS and GT.

/ Schedule G-PPPS (Public Purpose Program Surcharge) needs to be added to the TOTAL Non-CARE Charge and TOTAL CARE Charge for bill calculation. See Schedule G-PPPS for details and exempt customers.

CARE Schedules include California Solar Initiative (CSI) Exemption in accordance with Advice Letter 3257-G-A.

Per dwelling unit per day (Multifamily Service)

Per installed space per day (Mobilehome Park Service)

The procurement rate includes a charge of \$0.04984 per therm to reflect account balance amortizations in accordance with Advice Letter 3157-G.

/ Residential bill credit of (\$24.62) per household, annual bill credit occurring in the **previous April 2021** bill cycle. This Residential bill credit will change in April 2022.

Seasons: Winter = Nov-Mar Summer = April-Oct

Seasons: Winter = Nov-Mar Summer = April-Oct

Pacific Gas and Electric Company
Schedule G-SUR
Customer-Procured Gas Franchise Fee Surcharge
January 1, 2017, to Present
(\$/therm)

Month	Year 2022		Year 2021		Year 2020		Year 2019		Year 2018		Year 2017	
	Effective Date	Rate	Effective Date	Rate	Effective Date	Rate	Effective Date	Rate	Effective Date	Rate	Effective Date	Rate
January	1/1	\$0.00447	1/1	\$0.00262	1/1	\$0.00238	1/1	\$0.00305	1/1	\$0.00209	1/1	\$0.00434
February	2/1	\$0.00494	2/1	\$0.00265	2/1	\$0.00195	2/1	\$0.00273	2/1	\$0.00228	2/1	\$0.00420
March	3/1	\$0.00440	3/1	\$0.00281	3/1	\$0.00147	3/1	\$0.00256	3/1	\$0.00175	3/1	\$0.00357
April			4/1	\$0.00246	4/1	\$0.00134	4/1	\$0.00205	4/1	\$0.00175	4/1	\$0.00356
May			5/1	\$0.00240	5/1	\$0.00135	5/1	\$0.00142	5/1	\$0.00132	5/1	\$0.00345
June			6/1	\$0.00252	6/1	\$0.00147	6/1	\$0.00124	6/1	\$0.00121	6/1	\$0.00345
July			7/1	\$0.00216	7/1	\$0.00135	7/1	\$0.00116	7/1	\$0.00132	7/1	\$0.00205
August			8/1	\$0.00219	8/1	\$0.00139	8/1	\$0.00130	8/1	\$0.00175	8/1	\$0.00212
September			9/1	\$0.00234	9/1	\$0.00195	9/1	\$0.00129	9/1	\$0.00140	9/1	\$0.00161
October			10/1	\$0.00407	10/1	\$0.00163	10/1	\$0.00135	10/1	\$0.00142	10/1	\$0.00193
November			11/1	\$0.00506	11/1	\$0.00265	11/1	\$0.00167	11/1	\$0.00207	11/1	\$0.00209
December			12/1	\$0.00512	12/1	\$0.00277	12/1	\$0.00230	12/1	\$0.00302	12/1	\$0.00233

Please see Rate Schedule G-SUR for further details.

*Effective July 1, 2017, Franchise Fee Factor Changed due to 2017 GRC D. 17-05-013.



GAS PRELIMINARY STATEMENT PART O
CPUC REIMBURSEMENT FEE

Sheet 1

O. CPUC REIMBURSEMENT FEE

1. REIMBURSEMENT FEE

a. **PURPOSE:** The purpose of this provision is to set forth the Public Utilities Commission Reimbursement Fee (Chapter 323, Statutes of 1983) to be paid by utilities to fund regulation by the California Public Utilities Commission (CPUC) (Public Utilities Code, Sections 401-443). The fee is ordered by the CPUC under Section 433. Surcharge fees shall be forwarded to the CPUC on a quarterly basis between the 1st and the 15th days of October, January, April and July.

b. **APPLICABILITY:** This reimbursement fee applies to all gas delivery service rendered under all rate schedules and contracts authorized by the CPUC, with the exception of interdepartmental sales or transfers, and sales to electric, gas, or steam heat public utilities. It is applicable within the entire territory served by the company.

c. The current CPUC Reimbursement Fee Rate is \$0.00585 per therm including Revenue Fees and Uncollectible (RF&U) accounts expense for all applicable gas rate schedules (see Preliminary Statement, Part B), except for gas rate schedule G-EG (Electric Generation) (I)

The current CPUC Reimbursement Fee Rate for gas rate schedule G-EG is \$0.00086 per therm including RF&U as adopted in PG&E's 2010 Biennial Cost Allocation Proceeding Decision 10-06-035. (I)

2. MASTER-METERED MOBILEHOME PARK SAFETY PROGRAM SURCHARGE

a. **PURPOSE:** The purpose of this provision is to set forth the CPUC Mobilehome Park Safety Inspection and Enforcement Program Surcharge to be paid by mobilehome park operators with master-metered natural gas distribution systems. The surcharge will recover the CPUC's costs to implement and maintain a safety inspection and enforcement program as mandated by the CPUC under the authority granted by Public Utility Code Sections 4351-4358. Surcharge fees shall be forwarded to the CPUC on a quarterly basis between the 1st and 15th days of October, January, April and July.

b. **APPLICABILITY:** This surcharge applies to all gas delivery service provided to all master-metered mobilehome parks on Schedules GM, GML, GT, GTL and G-NR1.

c. **RATE:** The Master-Metered Mobilehome Park Safety Program Surcharge is \$0.00691 per installed space per day (\$0.21 per installed space per month). This rate is included in Schedule G-MHPS.

Residential GAS Baseline Territories and Quantities ^{1/}

Implemented November 1, 2019 - Present

BASELINE QUANTITIES (Therms **Per Day** Per Dwelling Unit)

Individually Metered			
Baseline Territories	Summer (April-October) Effective Apr. 1, 2020	Winter Off-Peak (Nov, Feb, Mar) Effective Nov. 1, 2019	Winter On-Peak (Dec, Jan) Effective Dec. 1, 2019
P	0.39	1.88	2.16
Q	0.59	1.55	2.16
R	0.36	1.28	1.97
S	0.39	1.38	2.06
T	0.59	1.38	1.81
V	0.62	1.51	1.84
W	0.39	1.18	1.84
X	0.49	1.55	2.16
Y	0.69	2.15	2.65

Master Metered			
Baseline Territories	Summer (April-October) Effective Apr. 1, 2020	Winter Off-Peak (Nov, Feb, Mar) Effective Nov. 1, 2019	Winter On-Peak (Dec, Jan) Effective Dec. 1, 2019
P	0.29	0.87	1.00
Q	0.49	0.64	0.77
R	0.33	0.84	1.19
S	0.29	0.54	0.68
T	0.49	0.94	1.06
V	0.56	1.18	1.29
W	0.23	0.61	0.87
X	0.33	0.64	0.77
Y	0.36	0.87	1.00

Summer Season: Apr-Oct

Winter Off-Peak: Nov, Feb, Mar

Winter On-Peak: Dec, Jan

Decision 18-10-040

Advice Letter: 4047-G

Filed: 12/5/18

Approved: 1/4/19

QUESTIONNAIRE FOR DEVELOPMENT OF TAX CREDIT PROPERTIES UTILITY ALLOWANCES

**Questionnaire for Quoting Price for Development of
Tax Credit, Project-Based Section 8, or Mixed-Finance Properties Utility Allowances**

Date: 2/28/22

Contact Person: Ismael Alvarado Title: Housing Complex Manager

Phone Number: 209-652-4272 Fax Number: 209-382-2114

Agency's Name: Housing Authority County of Merced

Email Address: Ismaela@merced-pha.com

Address: 405 U Street City/State/Zip: Merced, CA 95341

Complete the following for each building site/location: **Tax Credit Property?** ☐ Yes ☒ No
Other Program that are financing this property? USDA Rural Development

Name of Property: Felix Torres Farm Worker Family Housing Center

New Construction? ☐ Yes ☒ No

Rehab? ☐ Yes ☒ No

Location of Property: 925 N. Plainsburg Rd., Planada CA 95365 (City, State & Zip Code)

Street Address: same as above Year built: 2011

Type of Study Methodology:

- ☐ Baseline-required for existing HUD funded **Multifamily property (ex:PBRA, S202, RAD)**
☒ ResidentLife Utility Allowance Site-specific Utility Allowance program (also for PBV)
☐ Energy Consumption Model (REM/Rate Software Modeling) (Requires building plans)
☐ HUD Utility Schedule Model (Must check one: ☒ Energy Star, ☐ LEED, ☐ Green Retrofit)

Total Number of Units: 50

Total Number of Buildings: 25

Number of each **Bedroom Size** (check all applicable):

☐ 1 BR # ☒ 2 BR # 27 ☒ 3 BR # 19 ☒ 4 BR # 4 ☐ 5 BR #

Number of **Floor Plans** for each Bedroom Size (check all applicable):

☐ 1 BR # ☐ 2 BR # ☐ 3 BR # ☐ 4 BR # ☐ 5 BR #

Optional: Square Footage for each Bedroom Size (check all applicable):

☐ 1 BR # ☒ 2 BR # +/- 572 ☒ 3 BR # +/- 780 ☒ 4 BR # +/- 950 ☐ 5 BR #

Building Type Construction (check all applicable):

☐ Apartment ☐ Townhouse (Garden)/Quads ☒ Duplex ☐ Detached House

Number of **Stories for building** (check all applicable):

☒ all 1 story ☐ 1 and 2 story ☐ all 2 story ☐ 2 and 3 story ☐ all 3 story ☐ more than 3 story

Number of **Stories for unit:** ☒ 1 story ☐ 2 story

Utility Allowances Needed: ☐ Electric Only ☒ Gas & Electric ☐ including Water & Sewer
☐ including Trash Collection

Tenant-Paid Applicable Utility Provider(s): Pacific Gas and Electric

Heating Equipment: ☐ Heat Pump ☐ Electric Resistance ☒ Gas (forced air)

Air Conditioning ☒ Yes or ☐ No - **Water Heater** Fuel: ☒ Gas or ☐ Electric - **Stove** Fuel: ☒ Gas or ☐ Electric

Other Energy Improvements:

Compliance Agency: _____

CUSTOMIZATION FOR BASE REM/RATE MODELS

Housing Agency:

Housing Authority of the County of Merced

Customization & Energy Efficiency Measures for Base Ekotrope Models

Please check appropriate box(s) for **each development/property** and note if different for other bedroom sizes in property. NOTE: Use separate form if criteria is different for BR sizes or more than one building type per property. **Blue text represents energy efficiency measures/equipment.**

Development Name & No.:

Felix Torres Farmworker Housing Center (FTYR)

Building: Year Built: **2008** Structure Type: ☐ Apt ☐ High-Rise ☐ RH ☒ SD ☐ DH

Legend: Apt=Apartment (low-rise/mid-rise), RH=Row House/Townhouse, SD=Semi-Detached/Duplex, DH=Detached House

Resident-Paid Utilities: ☒ Electric ☒ Natural Gas ☐ Water ☐ Sewer ☐ Trash

Agency-Paid Check-Metered Utilities: ☐ Electric ☐ Natural Gas ☒ Water

OR ☐ All Utilities are Master Metered (Paid by the Agency) (Stop here if ALL utilities are Master Metered)

Bedroom Sizes: ☐ OBR/EFF () ☐ 1BR () ☒ 2BR (29) ☒ 3BR (19) ☒ 4BR (2) ☐ 5BR () ☐ 6BR ()

1 Foundation Type: ☒ Concrete Slab ☐ Pier-Beam (Crawl Space) ☐ Basement
 2 Window Type: ☐ Single Pane ☐ Double Pane Low-E ☒ Double Pane/Vinyl
 U-Factor: _____ SHGC: _____ (Solar Heat Gain Coefficient)
 3 # of Stories in Unit: ☒ One or ☐ Two ☐ Building has multiple stories
 4 Exterior Veneer/Cladding: ☒ Siding ☐ Brick ☐ Stucco ☐ Other: _____

HVAC
 5a Heating Fuel: ☐ Electric ☒ Natural Gas ☐ Other: _____
 5b Is Heating Individually Metered? ☒ Yes ☐ No
 5c Heating Type: ☐ Electric Baseboard ☒ Forced Air Furnace/Wall unit (80 AFUE) ☐ Central Boiler (radiant)
Energy Efficiencies Models ☐ Heat Pump ☒ Forced Air Furnace w/ducts ☐ electric or ☒ natural gas
 Heat Pump Efficiency Rating: SEER: _____ HSPF: _____
☐ Solar Panels Installed ☐ (High Efficiency) Gas Furnace (90 AFUE)
 (additional information is needed)

5d Heating Equipment Location: ☒ Conditioned Space ☐ Unconditioned Space (attic/garage)

5e Air Conditioning: ☒ Yes ☐ No Type: ☐ Window Unit ☒ Central Tonage: 3 Ton

6 Air Ducts: ☒ Yes ☐ No
 If Yes, Location: ☒ Conditioned Space ☐ Unconditioned Space (attic)

7a Water Heater: ☐ Electric (30 gal) ☐ Natural Gas (30 gal) ☐ Oil
 40-50 gallon ☐ Elec Tank .90 EF ☐ Gas Tank .58 EF ☐ Solar Water Heating
☐ Elec Tank .95 EF ☒ Gas Tank .62 EF (additional information is needed)
☐ Elec Tankless ☐ Gas Tankless .80 EF or higher

7b Water Heater Type: ☒ Individual units ☐ Central Boiler

7c Water Htr Location: ☐ Conditioned Space ☒ Unconditioned Space (attic/garage)

8 Stove/Range: ☐ Electric ☒ Natural Gas

9 **Energy Efficiencies:**
Insulation: ☐ Ceiling (R-20)(min.) ☒ Ceiling (R-38) ☒ Wall (R-13)
☐ Ceiling (R-30) ☐ Ceiling (R-49) ☐ Wall (R-19)
Low Flow Water: ☒ Shower, Faucets, Toilets **Lighting:** ☐ 100% CFL ☒ 100% LED

10 ☐ GeoThermal (HVAC and DHW) COP Rating: _____

Notes/Comments:

FUEL SUMMARY **REPORTS**

Fuel Summary

Property

405 U Street
Merced, CA 95341
Model: 2bd S/D
Community: Felix Torres Farmworker Ho
County of Merced, CA-USDA-SD-2BR
FTYR_2BR_gas.Semi

Organization

Fox Energy Specialists
James Rodriguez

Inspection Status

Results are projected



Builder

Housing Authority of the
County of Merced, CA

Annual Energy Cost

Natural Gas	\$305
Electric	\$381

Annual End-Use Cost

Heating	\$148
Cooling	\$78
Water Heating	\$84
Lights & Appliances	\$252
Onsite Generation	-\$0
Service Charges	\$124
Total	\$686

Annual End-Use Consumption

Heating [Natural Gas Therms]	186.3% $5 = 37$
Heating [Electric kWh]	100.5% $5 = 20$
Cooling [Electric kWh]	917.2% $7 = 131$
Hot Water [Natural Gas Therms]	112.2% $12 = 9$
Lights & Appliances [Natural Gas Therms]	28.0% $12 = 2$
Lights & Appliances [Electric kWh]	2,776.6% $12 = 231$
Total [Natural Gas Therms]	326.5
Total [Electric kWh]	3,794.3
Total Onsite Generation [Electric kWh]	0.0

Peak Electric Consumption

Peak Winter kW	0.33
Peak Summer kW	1.37

Utility Rates

Electricity	Default Electric Provider0
Natural Gas	Default Gas Provider0

Ele Summer: Lights & Apps, AC, fan motor: 382
Ele Winter: Lights & Apps, fan motor: 251
NG Summer: Water Heating, cooking: 11
NG Winter: Heating, water Heating, cooking: 48

Lighting and Appliances

Property

405 U Street
Merced, CA 95341
Model: 2bd S/D
Community: Felix Torres Farmworker

Organization

Fox Energy Specialists
James Rodriguez

Inspection Status

Results are projected



Builder

Housing Authority of the
County of Merced, CA

County of Merced, CA-USDA-SD-
2BR

FTYR_2BR_gas.Semi

ANNUAL SUMMARY

Summary

	Consumption	Annual Cost [\$]
Lighting [kWh/Year]	293.0	24
Electric Appliances [kWh/Year]	2,483.7	207
Fossil Fuel Appliances [MBtu/Year]	2.8	21
Total	-	252

LIGHTING

Lighting Scheme

	Consumption [kWh/Year]	Annual Cost [\$]
Interior Lighting	270.3	22
Exterior Lighting	22.7	2
Garage Lighting	0.0	0
Total	293.0	24

FOSSIL FUEL APPLIANCES

Appliance Type

	Consumption [MBtu/Year]	Annual Cost [\$]
Clothes Dryer	0.0	0
Range/Oven	2.8	21
Total	2.8	21

ELECTRIC APPLIANCES

Appliance Type

	Consumption [kWh/Year]	Annual Cost [\$]
Dishwasher	106.0	9
Range/Oven	28.0	2
Refrigerator	529.0	44
Clothes Dryer	437.9	36
Clothes Washer	32.9	3
Mechanical Ventilation	0.0	0
Ceiling Fan	143.7	12
Television	551.0	46
Miscellaneous	655.2	55
Total	2,483.7	207

Fuel Summary

Property

405 U Street
Merced, CA 95341
Model: 3bd S/D
Community: Felix Torres Farmworker Ho
County of Merced, CA-USDA-SD-3BR
FTYR_3BR_gas.Semi

Organization

Fox Energy Specialists
James Rodriguez

Inspection Status

Results are projected



Builder

Housing Authority of the
County of Merced, CA

Annual Energy Cost

Natural Gas	\$351
Electric	\$445

Annual End-Use Cost

Heating	\$182
Cooling	\$102
Water Heating	\$97
Lights & Appliances	\$292
Onsite Generation	-\$0
Service Charges	\$124
Total	\$796

Annual End-Use Consumption

Heating [Natural Gas Therms]	228.6% $\cdot 5 = 46$
Heating [Electric kWh]	123.3% $\cdot 5 = 25$
Cooling [Electric kWh]	1,201.9% $\cdot 7 = 172$
Hot Water [Natural Gas Therms]	129.1% $\cdot 12 = 11$
Lights & Appliances [Natural Gas Therms]	30.7% $\cdot 12 = 3$
Lights & Appliances [Electric kWh]	3,236.1% $\cdot 12 = 270$
Total [Natural Gas Therms]	388.4
Total [Electric kWh]	4,561.3
Total Onsite Generation [Electric kWh]	0.0

Peak Electric Consumption

Peak Winter kW	0.39
Peak Summer kW	1.72

Utility Rates

Electricity	Default Electric Provider
Natural Gas	Default Gas Provider

Ele Summer: Lights & Appliances, AC, fan motor: 467
Ele Winter: Lights & Appliances, fan motor: 295
NG Summer: Water Heating, cooking: 14
NG Winter: Heating, Water Heating, cooking: 60

Ekotrope RATER - Version 3.2.2.2878

All results are based on data entered by Ekotrope users. Ekotrope disclaims all liability for the information shown on this report

Lighting and Appliances

Property

405 U Street
Merced, CA 95341
Model: 3bd S/D
Community: Felix Torres Farmworker

County of Merced, CA-USDA-SD-3BR
FTYR_3BR_gas.Semi

Organization

Fox Energy Specialists
James Rodriguez

Builder

Housing Authority of the
County of Merced, CA

Inspection Status

Results are projected



ANNUAL SUMMARY

Summary

	Consumption	Annual Cost [\$]
Lighting [kWh/Year]	337.7	28
Electric Appliances [kWh/Year]	2,898.4	241
Fossil Fuel Appliances [MBtu/Year]	3.1	23
Total	-	292

LIGHTING

Lighting Scheme

	Consumption [kWh/Year]	Annual Cost [\$]
Interior Lighting	313.3	26
Exterior Lighting	24.4	2
Garage Lighting	0.0	0
Total	337.7	28

FOSSIL FUEL APPLIANCES

Appliance Type

	Consumption [MBtu/Year]	Annual Cost [\$]
Clothes Dryer	0.0	0
Range/Oven	3.1	23
Total	3.1	23

ELECTRIC APPLIANCES

Appliance Type

	Consumption [kWh/Year]	Annual Cost [\$]
Dishwasher	129.4	11
Range/Oven	30.7	3
Refrigerator	529.0	44
Clothes Dryer	517.1	43
Clothes Washer	38.8	3
Mechanical Ventilation	0.0	0
Ceiling Fan	191.6	16
Television	620.0	52
Miscellaneous	841.8	70
Total	2,898.4	241

Fuel Summary

Property

405 U Street
Merced, CA 95341
Model: 4br S/D
Community: Felix Torres Farmworker Ho

County of Merced, CA-USDA-SD-4BR
FTYR_4BR_gas.Semi

Organization

Fox Energy Specialists
James Rodriguez

Builder

Housing Authority of the
County of Merced, CA

Inspection Status

Results are projected



Annual Energy Cost

Natural Gas	\$383
Electric	\$488

Annual End-Use Cost

Heating	\$200
Cooling	\$106
Water Heating	\$109
Lights & Appliances	\$332
Onsite Generation	-\$0
Service Charges	\$124
Total	\$871

Annual End-Use Consumption

Heating [Natural Gas Therms]	252.0%	5=50
Heating [Electric kWh]	135.9%	5=27
Cooling [Electric kWh]	1,255.9%	7=179
Hot Water [Natural Gas Therms]	144.9%	12=12
Lights & Appliances [Natural Gas Therms]	33.4%	12=3
Lights & Appliances [Electric kWh]	3,685.3%	12=307
Total [Natural Gas Therms]	430.3	
Total [Electric kWh]	5,077.1	
Total Onsite Generation [Electric kWh]	0.0	

Peak Electric Consumption

Peak Winter kW	0.44
Peak Summer kW	1.92

Utility Rates

Electricity	Default Electric Provider0
Natural Gas	Default Gas Provider0

Ele Summer: Lights & Appliances, A/C, Fan motor: 513
Ele Winter: Lights & Appliances, Fan motor: 334
NG Summer: Water Heating, cooking: 15
NG Winter: Heating, water Heating, cooking: 65

Ekotrope RATER - Version 3.2.2.2878

All results are based on data entered by Ekotrope users. Ekotrope disclaims all liability for the information shown on this report

Lighting and Appliances

Property

405 U Street
Merced, CA 95341
Model: 4br S/D
Community: Felix Torres Farmworker

County of Merced, CA-USDA-SD-4BR

FTYR_4BR_gas.Semi

Organization

Fox Energy Specialists
James Rodriguez

Builder

Housing Authority of the
County of Merced, CA

Inspection Status

Results are projected



ANNUAL SUMMARY

Summary

	Consumption	Annual Cost [\$]
Lighting [kWh/Year]	380.4	32
Electric Appliances [kWh/Year]	3,304.9	275
Fossil Fuel Appliances [MBtu/Year]	3.3	25
Total	-	332

LIGHTING

Lighting Scheme

	Consumption [kWh/Year]	Annual Cost [\$]
Interior Lighting	354.4	29
Exterior Lighting	26.0	2
Garage Lighting	0.0	0
Total	380.4	32

FOSSIL FUEL APPLIANCES

Appliance Type

	Consumption [MBtu/Year]	Annual Cost [\$]
Clothes Dryer	0.0	0
Range/Oven	3.3	25
Total	3.3	25

ELECTRIC APPLIANCES

Appliance Type

	Consumption [kWh/Year]	Annual Cost [\$]
Dishwasher	152.7	13
Range/Oven	33.4	3
Refrigerator	529.0	44
Clothes Dryer	596.4	50
Clothes Washer	44.8	4
Mechanical Ventilation	0.0	0
Ceiling Fan	239.5	20
Television	689.0	57
Miscellaneous	1,020.1	85
Total	3,304.9	275

INTRODUCTION TO EKOTROPE SOFTWARE PROGRAM

INTRODUCTION TO EKOTROPE SOFTWARE PROGRAM

1. Ekotrope Software Design Objective

Ekotrope – Residential Energy Analysis and Rating Software Program is a sophisticated, residential energy analysis, code compliance and rating software program. Ekotrope calculates heating, cooling, hot water, lighting, and appliance energy loads, consumption and costs for new and existing single and multi-family homes.

Ekotrope operates in Windows and has many unique features, including a simplified input procedure, extensive component libraries, automated energy efficient improvement analysis, duct conduction and leakage analysis, latent and sensible cooling analysis, lighting and appliance audit, and active and passive solar analysis.

A home energy rating is calculated based on the proposed Department of Energy (DOE) Home Energy Rating System (HERS) guidelines (10 CFR 437) as modified by the RESNET/NASEO (Residential Energy Service Network/National Association of State Energy Officials) HERS Technical Committee. Ekotrope also creates value added information including energy appraisal addendum, energy code compliance (Model Energy Code (MEC) and American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)), improvement analysis (existing homes), design optimization (new homes), heating and cooling equipment sizing and U.S. Environmental Protection Agency (EPA) Energy Star Home analysis.

2. Use of Ekotrope in Utility Allowance Development

Ekotrope utilizes an Engineering approach to calculate the consumption allowance for various types of new and existing homes. The Ekotrope software program is recognized and approved by EPA, DOE and HUD.

The Nelrod Company is accredited and licensed by HERS/RESNET and a certified and licensed Ekotrope provider and user. We have successfully conducted energy home rating and energy audits using this software for over 31,550 reports. The information from our past experience and these reports is used to develop models for the most common building types and bedroom sizes, which in turn are utilized in developing average monthly utility allowances.

3. Basic Procedures

The data needed for this program is collected either from the building/site plans provided and/or from a site visit. Building type models are developed for the most common building types (Single-Family Detached House, Semi-Detached/Duplex, Row/Townhouse, Multi-Family Walk-Up, and Manufactured Homes) and bedroom sizes. The program

calculates heating, cooling, hot water, lighting and appliances energy load, consumption and cost based on home's design and construction features as well as climate and energy cost data.

The calculations are conducted following the Residential Energy Services Network (RESNET) Home Energy Rating System (HERS) technical guidelines, developed in cooperation with, US DOE, US Department of Veterans Affairs (USVA), HUD, and the National Association of State Energy Officials (NASEO) as the rating system used to determine energy usage in new and existing construction. The guidelines were established as the only national standard for determining energy savings based on construction types and local (community-wide) geographical locations. It estimates the annual energy quantity a home will require and the cost of that energy based on local utility rates. The guidelines make assumptions about the size and lifestyle of the family who will occupy the home. These assumptions are based on nationally accepted standards developed by the US DOE, American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) and US EPA. Such assumptions include occupancy rates of 2 persons for the first bedroom and one additional person for each additional bedroom; thermostat setting of 68° Fahrenheit for heating and 78° Fahrenheit for cooling, which is the recommended setting for an energy conserving household. To determine water heater energy usage, tap water temperatures are adjusted for local geographical locations and 120° thermostat settings are used, which is considered energy conservative. In addition, architectural components are considered such as square footages, number of stories, insulation R-values, wall materials, mechanical equipment types and efficiencies.

The Ekotrope software utilizes default standards based on national trends. (See details following this introduction.) If there are no local surveys available regarding residential lifestyles, a residential rental market study can be conducted to gather data on the most common household amenities, such as, dishwashers, clothes washers and dryers, microwaves, and size of refrigerators.

Additionally, the Agency can provide architectural characteristics concerning common foundation types, exterior siding, and other structure features for their area. This information will be used to further adjust the building type models.

4. Input Values and Determination

Ekotrope provides two levels of inputs: simplified and detailed. Simplified inputs use general design characteristics and built-in algorithms to determine the results. We use detailed inputs which provide the user greater control over calculational values and development of common building type models.

The various input parameters are as follows:

- Location – List of US and Canadian locations;
- Energy costs – create or modify various utility rates based on the existing market;
- Building Component data – Foundation type, Opaque wall constructional details, window/skylights conduction and solar gain values, type of ceilings and doors, heating equipment, cooling equipment, water heating equipment, various types of lights and appliances used.

These values are determined either from verified conditions/site visits or from the building plans. A Certified IECC (International Energy Conservation Code) Inspector/HERS/RESNET (Home Energy Rating Systems/Residential Energy Services Network) Rater inputs characteristics from building plans and/or from documentation gathered from an on-site inspection of the physical, structural and mechanical details. We use the criteria from our past experience to develop models for common building types and bedroom sizes.

Climate data is available for cities and towns throughout North America. This data is updated periodically with new versions of the Ekotrope software program.

Extensive utility libraries can be created and maintained for specific utility provider rates and charges and are available to apply to consumption data to determine local utility allowances.

5. Output Values, Interpretation and Use for Utility Allowances

Fifty-six preformatted reports are available for viewing on screen or printing. Reports include energy use, energy cost, design loads, rating, quick report, improvement analysis, code compliance, and economic analysis of energy upgrades.

Reports are generated from the building type models in the Ekotrope software program and analyzed for consumption usage totals by energy end-use categories. (Fuel Summary and Lights & Appliance Summary.)

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EKOTROPE SOFTWARE DEFAULT AUDIT

Ekotrope Software Default Audit

Lighting and Appliance Algorithms

Ekotrope Software uses the energy consumption of basic home appliances for the Default Loads. The appliances for the **Default Loads** are:

Lighting (permanent and non-permanent)

Plug Loads

Refrigerator/Freezer

Clothes Washer

Clothes Dryer

Oven/Range

The consumption in MMBtu is dependent on what the days of the heating and cooling seasons are.

Number of Occupants based on HUD's occupancy standards, and HUD's Keating Memo.

Lighting (Watt h / Day) = $[HR_c + (Area/HR_{area}) + (HR_{occ} \times Occupants)] \times Watts / Fixture$

Where:

HR_c	constant number of fixture (or bulb) hours
HR_{area}	number of square feet per fixture (or bulb) hours
HR_{occ}	number of fixture (or bulb) hours per occupant
Area	conditioned area
Occupants	number of occupants in the structure

Permanently Installed Lighting:

	Heating Season	Cooling Season
HR_c	8	7
HR_{area}	500	800
HR_{occ}	2	1
Watts/Fixture Incandescent	100	100
Watts/Fixture Fluorescent	30	30

Non-Permanently Installed Lighting:

	Heating Season	Cooling Season
HR_c	14	10
HR_{area}	350	600
HR_{occ}	2.5	1
Watts/Fixture Incandescent	70	70
Watts/Fixture Fluorescent	25	25

Appliance Load

Lighting: The lighting usage is described in terms of fixture-hours and bulb-hours, (e.g. three fixture hours would be present if one fixture is on for 3 hours, or 3 fixtures are on for one hour). The lighting usage can then be determined by multiplying the number of lamp hours by the wattage per lamp, which would be determined by the percentage of fluorescent lamps.

Three terms exist in the determination of the number of fixture hours: a constant, a ratio by area, and a ratio by number of occupants (e.g. bedrooms). HR_c fixture hours/day are assumed as a base load. Added to this is one fixture hour/day for every HR_{area} square foot of conditioned area, and HR_{occ} fixture hours/day for each occupant (four non-permanently installed lights, substitute bulb hours in place of fixture hours.)

100 watts/fixture is assumed for the average permanently installed incandescent fixture, and 30 watts/fixture for the average permanently installed fluorescent fixture. The actual wattage assumed is ratioed by the percentage of fluorescent fixtures. If no information is input, a ratio of 10% fluorescent fixtures is assumed.

70 watts/bulb is assumed for the average non-permanently installed incandescent bulb, and 25 watts/bulb for the average non-permanently installed fluorescent bulb. Again, the actual wattage is dependent upon the percentage of fluorescent bulbs, and a value of 10% is used if no information is input on non-permanently installed lighting.

Refrigerator: Vary refrigerators' consumption by year, type and size, based on the data provided by VEIC. The load due to year shall be interpolated, and the load due to size shall stay in the batch mode, (e.g. the program will pick which data to use by type and size, and then interpolate the data for the year).

Range/Oven:

Electric: 1.5 kwh/day (550 kwh/yr)

Gas: 12,000 Btu/day (4.4 MMBtu/yr)

Clothes Washer:

30 kwh/yr/person

Clothes Dryer:

Electric: $300 \text{ kwh/yr/person} = 2 \text{ people for } 1^{\text{st}} \text{ bedroom} + 1 \text{ for each additional} = 3.5$
persons $\times 25 \text{ kwh} = 87.50 \text{ kwh}$

Gas 1.5 MMBtu/yr/person + 35 kwh (Electric)/yr/person

Plug Loads: 1.25 kwh/day + 1.75 kwh/day/person

Detailed Audit

Ekotrope also allows the user to enter the details of the Lights and Appliances by choosing the Perform Detailed Audit ratio button. By selecting this option, the user can enter the exact internal loads of the residential building.

The following table describes a detailed audit performed on the REM example building:

Name	Type	Location	Qty	Fuel	Use	Efficiency
Ceiling Fan	Miscellaneous	Conditioned Area	1	Electricity	220.0 kwh/ Year	Standard
Dishwasher	Dishwasher	Conditioned Area	1	Electricity	290.0 kwh/ Year	Standard
Clothes Dryer	Clothes Dryer	Conditioned Area	1	Electricity	880.0 kwh/ Year	Standard
Lights	Light Fixture(s)	Conditioned Area	1	Electricity	940.0 kwh/ Year	Standard
Microwave	Microwave	Conditioned Area	1	Electricity	190.0 kwh/ Year	Standard
Plug Loads	Plug Load(s)	Conditioned Area	1	Electricity	500.0 kwh/ Year	Standard
Range/Oven	Range/Oven	Conditioned Area	1	Electricity	450.0 kwh/ Year	Standard
Refrigerator	Refrigerator	Conditioned Area	1	Electricity	1150.0 kwh/ Year	Standard
Television	Miscellaneous	Conditioned Area	1	Electricity	720.0 kwh/ Year	Standard
Washer	Clothes Washer	Conditioned Area	1	Electricity	100.0 kwh/ Year	Standard
Washer	Clothes Washer	Conditioned Area	1	Water	5.0 gallons/ Week	Standard
Shower	Shower/Bath	Conditioned Area	1	Water	10.0 gallons/ Day	Standard

Internal Gains in (Rating) Load:

The internal gains will include all of the heat from the refrigerator, the oven/range, the clothes washer, and the plug loads. Heat from the dryer is assumed to be vented out of the conditioned space.

Domestic Hot Water (DHW)

The assumption currently used for DHW is 30 gallons + 10 gallons/occupant, and will not be changed with the presence or absence of dish or clothes washers. Reasons for this include: the 30 gallons + 10 gallons/occupant average includes the averaged use of dishwashers and clothes washers. People will use some water to wash dishes if they do not have a dishwasher, but it is not clear whether the amount of water they use could approach the amount used by a dishwasher. A clothes washer is assumed to exist, as 75 percent of all households contain a clothes washer. Therefore, no adjustment is needed.

Ekotrope Internal Gains Data

Daily internal gains (Btu/day) are assumed to be:

	Heating	Cooling
Lighting	2,100/occ	1,200/occ
Appliance	3,000/occ + 15,000	3,000/occ + 15,000
Occupant	4,800/occ	4,800/occ
Total (Btu/day)	9,900/occ + 15,000	9,900/occ + 15,000
(Btu/hr)	413/occ + 625	375/occ + 625

If the DHW type is Heat Pump, the internal gains are further adjusted:

	Heating	Cooling
Heat Pump DHW	7,000/occ	8,000/occ

The number of occupants is assumed to be equal to the number of bedrooms in the home.

The Ekotrope method assumes that the gains are constant over the day and thus half occur during the daytime, coincident with the solar gains, and half at night when no solar gains are present. The internal gains during these two time periods are treated separately when the heating and cooling loads are calculated.