BUILDING ENERGY ANALYSIS REPORT

PROJECT:

John Rogers
420 1ST STREET
COLUSA, CA 95932

Project Designer:

OUTKAST DESIGNS
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Report Prepared by:

OUTKAST
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Job Number:

9272-18

Date:

1/20/2018

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2016 Building Energy Efficiency Standards.

This program developed by EnergySoft Software – www.energysoft.com.

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GENERAL INFORMATION					
01	**Project Name**	420 1 Street			
02	**Calculation Description**	Title 24 Analysis			
03	**Project Location**	420 1ST STREET			
04	**City**	COLUSA	05	**Standards Version**	Compliance 2017
06	**Zip Code**	95932	07	**Compliance Manager Version**	BEMCmpMgr 2016.3.0 (1016 SP2)
08	**Climate Zone**	CZ11	09	**Software Version**	EnergyPro 7.2
10	**Building Type**	Single Family	11	**Front Orientation (deg/Cardinal)**	0
12	**Project Scope**	Addition and/or Alteration	13	**Number of Dwelling Units**	1
14	**Total Cond. Floor Area (ft^2)**	922	15	**Number of Zones**	1
16	**Slab Area (ft^2)**	0	17	**Number of Stories**	1
18	**Addition Cond. Floor Area (ft^2)**	0	19	**Natural Gas Available**	Yes
20	**Addition Slab Area (ft^2)**	0	21	**Glazing Percentage (%)**	10.4%

COMPLIANCE RESULTS	
01	**Building Complies with Computer Performance**
02	**This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CEC-approved HERS provider.**
03	**This building incorporates one or more Special Features shown below**

ENERGY USE SUMMARY

04	05	06	07	08
Energy Use (kTDV/ft^2-yr)	**Standard Design**	**Proposed Design**	**Compliance Margin**	**Percent Improvement**
Space Heating	27.36	19.99	7.37	26.9%
Space Cooling	74.41	81.23	-6.82	-9.2%
IAQ Ventilation	0.00	0.00	0.00	0.0%
Water Heating	15.34	15.34	0.00	0.0%
Photovoltaic Offset	----	0.00	0.00	----
Compliance Energy Total	**117.11**	**116.56**	**0.55**	**0.5%**

REQUIRED SPECIAL FEATURES

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

- **Insulation below roof deck**
- **Window overhangs and/or fins**

HERS FEATURE SUMMARY

The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building components tables below.

Building-level Verifications:
- **--None--**

Cooling System Verifications:
- **Minimum Airflow**
- **Fan Efficacy Watts/CFM**

HVAC Distribution System Verifications:
- **Duct Sealing**

Domestic Hot Water System Verifications:
- **-- None --**

BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	**Conditioned Floor Area (ft^2)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
420 1 Street	922	1	2	1	0	1

ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft^2)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Water Heating System 2**
HOUSE	Conditioned	HVAC1	922	8	DHW Sys 1	n/a

OPAQUE SURFACES

01	02	03	04	05	06	07	08	09	10
Name	Zone	Construction	Azimuth	Orientation	Gross Area (ft^2)	Window & Door Area (ft^2)	Tilt (deg)	Status	Verified Existing Condition
FRONT-F1	HOUSE	R-15 Wall	90	Left	109.64	32	90	Altered	n/a
FRONT-F2	HOUSE	R-15 Wall	90	Left	110.13	12	90	Altered	n/a
LEFT-L1	HOUSE	R-15 Wall	180	Back	270.11	30	90	Altered	n/a
LEFT-L2	HOUSE	R-15 Wall	180	Back	86.95	3	90	Altered	n/a
BACK-B1	HOUSE	R-15 Wall	270	Right	119.43	3	90	Altered	n/a
BACK-B2	HOUSE	R-15 Wall	270	Right	97.63	29.77	90	Altered	n/a
RIGHT-R1	HOUSE	R-15 Wall	0	Front	307.13	24	90	Altered	n/a
RIGHT-R2	HOUSE	R-15 Wall	0	Front	49.9	0	90	Altered	n/a
Roof	HOUSE	R-30 Roof Attic			1073			Altered	n/a
Raised Floor	HOUSE	R-19 Floor Crawlspace			922			Altered	n/a

ATTIC

01	02	03	04	05	06	07	08	09	10
Name	Construction	Type	Roof Rise	Roof Reflectance	Roof Emittance	Radiant Barrier	Cool Roof	Status	Verified Existing Condition
Attic HOUSE	Attic RoofHOUSE	Ventilated	6	0.1	0.85	No	No	Existing	No

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10	11
Name	Surface (Orientation-Azimuth)	Width (ft)	Height (ft)	Multiplier	Area (ft^2)	U-factor	SHGC	Exterior Shading	Status	Verified Existing Condition
Window- F1	FRONT-F1 (Left-90)	3.0	4.0	1	12.0	0.55	0.67	Insect Screen (default)	New	n/a
Window-F2	FRONT-F2 (Left-90)	3.0	4.0	1	12.0	0.55	0.67	Insect Screen (default)	New	n/a
Window-L1	LEFT-L1 (Back-180)	3.0	5.0	1	15.0	0.55	0.67	Insect Screen (default)	New	n/a
Window-L1.2	LEFT-L1 (Back-180)	3.0	5.0	1	15.0	0.55	0.67	Insect Screen (default)	New	n/a
Window-L2	LEFT-L2 (Back-180)	3.0	1.0	1	3.0	0.55	0.67	Insect Screen (default)	New	n/a
Window-B1	BACK-B1 (Right-270)	3.0	1.0	1	3.0	0.55	0.67	Insect Screen (default)	New	n/a
Window-B2	BACK-B2 (Right-270)	3.0	4.0	1	12.0	0.55	0.67	Insect Screen (default)	New	n/a
Window-R1	RIGHT-R1 (Front-0)	3.0	4.0	1	12.0	0.55	0.67	Insect Screen (default)	New	n/a
Window-R2	RIGHT-R1 (Front-0)	3.0	4.0	1	12.0	0.55	0.67	Insect Screen (default)	New	n/a

OPAQUE DOORS

01	02	03	04	05	06
Name	Side of Building	Area (ft^2)	U-factor	Status	Verified Existing Condition
Door-F1	FRONT-F1	20.0	0.50	New	No
Door-B2	BACK-B2	17.8	0.50	New	No

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
	Overhang					Left Fin				Right Fin			
Window	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
Window- F1	7.6	1	5.75	3.6	0	0	0	0	0	0	0	0	0
Window-F2	2	4.6	4.66	4.66	0	0	0	0	0	0	0	0	0
Window-L1	2	1	32.6	4.75	0	0	0	0	0	0	0	0	0
Window-L1.2	2	1	32.6	4.75	0	0	0	0	0	0	0	0	0
Window-L2	2	1	3.6	32.66	0	0	0	0	0	0	0	0	0
Window-B1	2	5.6	13.16	8.6	0	0	0	0	0	0	0	0	0
Window-B2	2	4.6	4.66	4.66	0	0	0	0	0	0	0	0	0
Window-R1	2	1	32.6	4.75	0	0	0	0	0	0	0	0	0
Window-R2	2	1	3.6	28	0	0	0	0	0	0	0	0	0

OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	06	07
Construction Name	Surface Type	Construction Type	Framing	Total Cavity R-value	Winter Design U-factor	Assembly Layers
Attic RoofHOUSE	Attic Roofs	Wood Framed Ceiling	2x4 Top Chord of Roof Truss @ 24 in. O.C.	R 15	0.066	• *Under Roof Joists: R-2.0 insul.* • *Cavity / Frame: R-13.0 / 2x4 Top Chrd* • *Roof Deck: Wood Siding/sheathing/decking* • *Roofing: Light Roof (Asphalt Shingle)*
R-19 Floor Crawlspace	Floors Over Crawlspace	Wood Framed Floor	2x6 @ 16 in. O.C.	R 19	0.049	• *Floor Surface: Carpeted* • *Floor Deck: Wood Siding/sheathing/decking* • *Cavity / Frame: R-19 / 2x6*
R-15 Wall	Exterior Walls	Wood Framed Wall	2x4 @ 16 in. O.C.	R 15	0.089	• *Inside Finish: Gypsum Board* • *Cavity / Frame: R-15 / 2x4* • *Exterior Finish: Wood Siding/sheathing/decking*
R-30 Roof Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O.C.	R 30	0.032	• *Inside Finish: Gypsum Board* • *Cavity / Frame: R-9.1 / 2x4* • *Over Ceiling Joists: R-20.9 insul.*

BUILDING ENVELOPE - HERS VERIFICATION

01	02	03	04
Quality Insulation Installation (QII)	**Quality Installation of Spray Foam Insulation**	**Building Envelope Air Leakage**	**CFM50**
Not Required	Not Required	Not Required	n/a

WATER HEATING SYSTEMS

01	02	03	04	05	06	07	08
Name	**System Type**	**Distribution Type**	**Water Heater**	**Number of Heaters**	**Solar Fraction (%)**	**Status**	**Verified Existing Condition**
DHW Sys 1	DHW	Standard	DHW Heater 1	1	0	New	No

WATER HEATERS

01	02	03	04	05	06	07	08	09	10	11	12
Name	**Heater Element Type**	**Tank Type**	**Number of Units**	**Tank Volume (gal)**	**Uniform Energy Factor / Energy Factor / Efficiency**	**Input Rating / Pilot / Thermal Efficiency**	**Tank Insulation R-value (Int/Ext)**	**Standby Loss / Recovery Eff**	**First Hour Rating / Flow Rate**	**NEEA Heat Pump Brand / Model**	**Tank Location or Ambient Condition**
DHW Heater 1	Gas	Small Instantaneous	1	1	0.82 EF	199,000 Btu/hr	0	n/a	n/a	n/a	n/a

SPACE CONDITIONING SYSTEMS

01	02	03	04	05	06	07	08
SC Sys Name	**System Type**	**Heating Unit Name**	**Cooling Unit Name**	**Fan Name**	**Distribution Name**	**Status**	**Verified Existing Condition**
HVAC1	Other Heating and Cooling System	Heating Component 1	Cooling Component 1	HVAC Fan 1	Air Distribution System 1	New	No

HVAC - HEATING UNIT TYPES

01	02	03	04
Name	**System Type**	**Number of Units**	**Efficiency**
Heating Component 1	CntrlFurnace	1	80 AFUE

HVAC - COOLING UNIT TYPES

01	02	03	04	05	06	07	08
Name	System Type	Number of Units	Efficiency EER	Efficiency SEER	Zonally Controlled	Compressor Type	HERS Verification
Cooling Component 1	SplitAirCond	1	11.7	14	Not Zonal	Single Speed	Cooling Component 1-hers-cool

HVAC COOLING - HERS VERIFICATION

01	02	03	04	05	06
Name	Verified Airflow	Airflow Target	Verified EER	Verified SEER	Verified Refrigerant Charge
Cooling Component 1-hers-cool	Required	350	Not Required	Not Required	Not Required

HVAC - DISTRIBUTION SYSTEMS

01	02	03	04	05	06	07	08	09	10
Name	Type	Duct Leakage	Insulation R-value	Supply Duct Location	Return Duct Location	Bypass Duct	Status	Verified Existing Condition	HERS Verification
Air Distribution System 1	Ducts located in attic (Ventilated and Unventilated)	Sealed and tested	6.0	Attic	Attic	None	New	No	Air Distribution System 1-hers-dist

HVAC DISTRIBUTION - HERS VERIFICATION

01	02	03	04	05	06	07	08
Name	Duct Leakage Verification	Duct Leakage Target (%)	Verified Duct Location	Verified Duct Design	Buried Ducts	Deeply Buried Ducts	Low-leakage Air Handler
Air Distribution System 1-hers-dist	Required	5.0	Not Required	Not Required	Not Required	Not Required	n/a

HVAC - FAN SYSTEMS & HERS VERIFICATION

01	02	03	04
Name	Type	Fan Power (Watts/CFM)	HERS Verification
HVAC Fan 1	Single Speed PSC Furnace Fan	0.58	Required

IAQ (Indoor Air Quality) FANS

01	02	03	04	05
Name	IAQ CFM	IAQ Fan Type	IAQ Recovery Effectiveness(%)	HERS Verification
SFam IAQVentRpt	0	Default	0	Not Required

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name: Scott Lunsford	Documentation Author Signature: *Scott Lunsford*
Company: Outkast Designs	Signature Date: 01/20/2018
Address: 1112 Main Street	CEA/HERS Certification Identification (If applicable):
City/State/Zip: Colusa, CA 95932	Phone: (530) 216-5050
RESPONSIBLE PERSON'S DECLARATION STATEMENT	
I certify the following under penalty of perjury, under the laws of the State of California: 1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance. 2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations. 3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.	
Responsible Designer Name: Scott Lunsford	Responsible Designer Signature: *Scott Lunsford*
Company: Outkast Designs	Date Signed: 01/20/2018
Address: 1112 Main Street	License:
City/State/Zip: Colusa, CA 95932	Phone: (530) 216-5050

RESIDENTIAL MEASURES SUMMARY — RMS-1

Project Name	Building Type	Date
John Rogers	☑ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	*1/20/2018*

Project Address	California Energy Climate Zone	Total Cond. Floor Area	Addition	# of Units
420 1ST STREET COLUSA	*CA Climate Zone 11*	*922*	*0*	*1*

INSULATION

Construction	Type	Cavity	Area (ft^2)	Special Features	Status
Floor	*Wood Framed w/Crawl Space*	*R 22*	*922*		*Altered*
Wall	*Wood Framed*	*R 15*	*1,017*		*Altered*
Door	*Opaque Door*	*- no insulation*	*38*		*New*
Roof	*Wood Framed Attic*	*R 49*	*1,073*	*Add=R-15.0*	*Altered*

FENESTRATION

Total Area: *96* | Glazing Percentage: *10.4 %* | New/Altered Average U-Factor: *0.55*

Orientation	Area(ft^2)	U-Fac	SHGC	Overhang	Sidefins	Exterior Shades	Status
Left (E)	*12.0*	*0.550*	*0.67*	*7.6*	*none*	*Bug Screen*	*New*
Left (E)	*12.0*	*0.550*	*0.67*	*2.0*	*none*	*Bug Screen*	*New*
Rear (S)	*30.0*	*0.550*	*0.67*	*2.0*	*none*	*Bug Screen*	*New*
Rear (S)	*3.0*	*0.550*	*0.67*	*2.0*	*none*	*Bug Screen*	*New*
Right (W)	*3.0*	*0.550*	*0.67*	*2.0*	*none*	*Bug Screen*	*New*
Right (W)	*12.0*	*0.550*	*0.67*	*2.0*	*none*	*Bug Screen*	*New*
Front (N)	*12.0*	*0.550*	*0.67*	*2.0*	*none*	*Bug Screen*	*New*
Front (N)	*12.0*	*0.550*	*0.67*	*2.0*	*none*	*Bug Screen*	*New*

HVAC SYSTEMS

Qty.	Heating	Min. Eff	Cooling	Min. Eff	Thermostat	Status
1	*Central Furnace*	*80% AFUE*	*Split Air Conditioner*	*14.0 SEER*	*Setback*	*New*

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Status
HVAC	*Ducted*	*Ducted*	*Attic*	*6.0*	*New*

WATER HEATING

Qty.	Type	Gallons	Min. Eff	Distribution	Status
1	*Small Instantaneous Gas*	*1*	*0.82*	*Standard*	*New*

2016 Low-Rise Residential Mandatory Measures Summary

*NOTE: Low-rise residential buildings subject to the Energy Standards must comply with all applicable mandatory measures, regardless of the compliance approach used. Review the respective section for more information. *Exceptions may apply.*
(Original 08/2016)

Building Envelope Measures:	
§ 110.6(a)1:	**Air Leakage.** Manufactured fenestration, exterior doors, and exterior pet doors must limit air leakage to 0.3 cfm/ft² or less when tested per NFRC-400 or ASTM E283 or AAMA/WDMA/CSA 101/I.S.2/A440-2011.*
§ 110.6(a)5:	**Labeling.** Fenestration products must have a label meeting the requirements of § 10-111(a).
§ 110.6(b):	**Field fabricated exterior doors and fenestration** products must use U-factors and solar heat gain coefficient (SHGC) values from TABLES 110.6-A and 110.6-B for compliance and must be caulked and/or weatherstripped.*
§ 110.7:	**Air Leakage.** All joints, penetrations, and other openings in the building envelope that are potential sources of air leakage must be caulked, gasketed, or weather stripped.
§ 110.8(a):	**Insulation Certification by Manufacturers.** Insulation specified or installed must meet Standards for Insulating Material.
§ 110.8(g):	**Insulation Requirements for Heated Slab Floors.** Heated slab floors must be insulated per the requirements of § 110.8(g).
§ 110.8(i):	**Roofing Products Solar Reflectance and Thermal Emittance.** The thermal emittance and aged solar reflectance values of the roofing material must meet the requirements of § 110.8(i) when the installation of a cool roof is specified on the CF1R.
§ 110.8(j):	**Radiant Barrier.** A radiant barrier must have an emittance of 0.05 or less and be certified to the Department of Consumer Affairs.
§ 150.0(a):	**Ceiling and Rafter Roof Insulation.** Minimum R-22 insulation in wood-frame ceiling; or the weighted average U-factor must not exceed 0.043. Minimum R-19 or weighted average U-factor of 0.054 or less in a rafter roof alteration. Attic access doors must have permanently attached insulation using adhesive or mechanical fasteners. The attic access must be gasketed to prevent air leakage. Insulation must be installed in direct contact with a continuous roof or ceiling which is sealed to limit infiltration and exfiltration as specified in § 110.7, including but not limited to placing insulation either above or below the roof deck or on top of a drywall ceiling.*
§ 150.0(b):	**Loose-fill Insulation.** Loose fill insulation must meet the manufacturer's required density for the labeled R-value.
§ 150.0(c):	**Wall Insulation.** Minimum R-13 insulation in 2x4 inch wood framing wall or have a U-factor of 0.102 or less (R-19 in 2x6 or U-factor of 0.074 or less). Opaque non-framed assemblies must have an overall assembly U-factor not exceeding 0.102, equivalent to an installed value of R-13 in a wood framed assembly.*
§ 150.0(d):	**Raised-floor Insulation.** Minimum R-19 insulation in raised wood framed floor or 0.037 maximum U-factor.*
§ 150.0(f):	**Slab Edge Insulation.** Slab edge insulation must meet all of the following: have a water absorption rate, for the insulation material alone without facings, no greater than 0.3%; have a water vapor permeance no greater than 2.0 perm/inch; be protected from physical damage and UV light deterioration; and, when installed as part of a heated slab floor, meet the requirements of § 110.8(g).
§ 150.0(g)1:	**Vapor Retarder.** In Climate Zones 1-16, the earth floor of unvented crawl space must be covered with a Class I or Class II vapor retarder. This requirement also applies to controlled ventilation crawl space for buildings complying with the exception to § 150.0(d).
§ 150.0(g)2:	**Vapor Retarder.** In Climate Zones 14 and 16, a Class I or Class II vapor retarder must be installed on the conditioned space side of all insulation in all exterior walls, vented attics, and unvented attics with air-permeable insulation.
§ 150.0(q):	**Fenestration Products.** Fenestration, including skylights, separating conditioned space from unconditioned space or outdoors must have a maximum U-factor of 0.58; or the weighted average U-factor of all fenestration must not exceed 0.58.*
Fireplaces, Decorative Gas Appliances, and Gas Log Measures:	
§ 150.0(e)1A:	**Closable Doors.** Masonry or factory-built fireplaces must have a closable metal or glass door covering the entire opening of the firebox.
§ 150.0(e)1B:	**Combustion Intake.** Masonry or factory-built fireplaces must have a combustion outside air intake, which is at least six square inches in area and is equipped with a readily accessible, operable, and tight-fitting damper or combustion-air control device.*
§ 150.0(e)1C:	**Flue Damper.** Masonry or factory-built fireplaces must have a flue damper with a readily accessible control.*
§ 150.0(e)2:	**Pilot Light.** Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.
Space Conditioning, Water Heating, and Plumbing System Measures:	
§ 110.0-§ 110.3:	**Certification.** Heating, ventilation and air conditioning (HVAC) equipment, water heaters, showerheads, faucets, and all other regulated appliances must be certified by the manufacturer to the Energy Commission.*
§ 110.2(a):	**HVAC Efficiency.** Equipment must meet the applicable efficiency requirements in TABLE 110.2-A through TABLE 110.2-K.*
§ 110.2(b):	**Controls for Heat Pumps with Supplementary Electric Resistance Heaters.** Heat pumps with supplementary electric resistance heaters must have controls that prevent supplementary heater operation when the heating load can be met by the heat pump alone; and in which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating, and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating.*
§ 110.2(c):	**Thermostats.** All unitary heating or cooling systems not controlled by a central energy management control system (EMCS) must have a setback thermostat.*
§ 110.3(c)5:	**Water Heating Recirculation Loops Serving Multiple Dwelling Units.** Water heating recirculation loops serving multiple dwelling units must meet the air release valve, backflow prevention, pump priming, pump isolation valve, and recirculation loop connection requirements of § 110.3(c)5.
§ 110.3(c)7:	**Isolation Valves.** Instantaneous water heaters with an input rating greater than 6.8 kBTU/hr (2 kW) must have isolation valves with hose bibbs or other fittings on both cold water and hot water lines of water heating systems to allow for water tank flushing when the valves are closed.
§ 110.5:	**Pilot Lights.** Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces; household cooking appliances (appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt); and pool and spa heaters.*
§ 150.0(h)1:	**Building Cooling and Heating Loads.** Heating and/or cooling loads are calculated in accordance with ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; SMACNA Residential Comfort System Installation Standards Manual; or ACCA Manual J using design conditions specified in § 150.0(h)2.

§ 150.0(h)3A:	**Clearances.** Installed air conditioner and heat pump outdoor condensing units must have a clearance of at least 5 feet from the outlet of any dryer vent.
§ 150.0(h)3B:	**Liquid Line Drier.** Installed air conditioner and heat pump systems must be equipped with liquid line filter driers if required, as specified by manufacturer's instructions.
§ 150.0(j)1:	**Storage Tank Insulation.** Unfired hot water tanks, such as storage tanks and backup storage tanks for solar water-heating systems, must have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.
§ 150.0(j)2A:	**Water piping and cooling system line insulation.** For domestic hot water system piping, whether buried or unburied, all of the following must be insulated according to the requirements of TABLE 120.3-A: the first 5 feet of hot and cold water pipes from the storage tank; all piping with a nominal diameter of 3/4 inch or larger; all piping associated with a domestic hot water recirculation system regardless of the pipe diameter; piping from the heating source to storage tank or between tanks; piping buried below grade; and all hot water pipes from the heating source to kitchen fixtures.*
§ 150.0(j)2B:	**Water piping and cooling system line insulation.** All domestic hot water pipes that are buried below grade must be installed in a water proof and non-crushable casing or sleeve.*
§ 150.0(j)2C:	**Water piping and cooling system line insulation.** Pipe for cooling system lines must be insulated as specified in § 150.0(j)2A. Distribution piping for steam and hydronic heating systems or hot water systems must meet the requirements in TABLE 120.3-A.*
§ 150.0(j)3:	**Insulation Protection.** Insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.
§ 150.0(j)3A:	**Insulation Protection.** Insulation exposed to weather must be installed with a cover suitable for outdoor service. For example, protected by aluminum, sheet metal, painted canvas, or plastic cover. The cover must be water retardant and provide shielding from solar radiation that can cause degradation of the material.
§ 150.0(j)3B:	**Insulation Protection.** Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must have a Class I or Class II vapor retarder.
§ 150.0(n)1:	**Gas or Propane Systems.** Systems using gas or propane water heaters to serve individual dwelling units must include all of the following: a 120V electrical receptacle within 3 feet of the water heater; a Category III or IV vent, or a Type B vent with straight pipe between the outside termination and the space where the water heater is installed; a condensate drain that is no more than 2 inches higher than the base of the water heater, and allows natural draining without pump assistance; and a gas supply line with a capacity of at least 200,000 Btu/hr.
§ 150.0(n)2:	**Recirculating Loops.** Recirculating loops serving multiple dwelling units must meet the requirements of § 110.3(c)5.
§ 150.0(n)3:	**Solar Water-heating Systems.** Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC) or by a listing agency that is approved by the Executive Director.
Ducts and Fans Measures:	
§ 110.8(d)3:	**Ducts.** Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.
§ 150.0(m)1:	**CMC Compliance.** All air-distribution system ducts and plenums must be installed, sealed, and insulated to meet the requirements of CMC §§ 601.0, 602.0, 603.0, 604.0, 605.0 and ANSI/SMACNA-006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to a minimum installed level of R-6.0 (or higher if required by CMC § 605.0) or a minimum installed level of R-4.2 when entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8). Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than ¼ inch, the combination of mastic and either mesh or tape must be used. Building cavities, support platforms for air handlers, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms must not be compressed to cause reductions in the cross-sectional area of the ducts.*
§ 150.0(m)2:	**Factory-Fabricated Duct Systems.** Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.
§ 150.0(m)3:	**Field-Fabricated Duct Systems.** Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.
§ 150.0(m)7:	**Backdraft Dampers.** All fan systems that exchange air between the conditioned space and the outside of the building must have backdraft or automatic dampers.
§ 150.0(m)8:	**Gravity Ventilation Dampers.** Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.
§ 150.0(m)9:	**Protection of Insulation.** Insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service. For example, protected by aluminum, sheet metal, painted canvas, or plastic cover. Cellular foam insulation must be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation.
§ 150.0(m)10:	**Porous Inner Core Flex Duct.** Porous inner core flex duct must have a non-porous layer between the inner core and outer vapor barrier.
§ 150.0(m)11:	**Duct System Sealing and Leakage Test.** When space conditioning systems use forced air duct systems to supply conditioned air to an occupiable space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with § 150.0(m)11and Reference Residential Appendix RA3.
§ 150.0(m)12:	**Air Filtration.** Mechanical systems that supply air to an occupiable space through ductwork exceeding 10 feet in length and through a thermal conditioning component, except evaporative coolers, must be provided with air filter devices that meet the design, installation, efficiency, pressure drop, and labeling requirements of § 150.0(m)12.

§ 150.0(m)13:	Duct System Sizing and Air Filter Grille Sizing. Space conditioning systems that use forced air ducts to supply cooling to an occupiable space must have a hole for the placement of a static pressure probe (HSPP), or a permanently installed static pressure probe (PSPP) in the supply plenum. The space conditioning system must also demonstrate airflow ≥ 350 CFM per ton of nominal cooling capacity through the return grilles, and an air-handling unit fan efficacy ≤ 0.58 W/CFM as confirmed by field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.3. This applies to both single zone central forced air systems and every zone for zonally controlled central forced air systems.*
§150.0(o):	Ventilation for Indoor Air Quality. All dwelling units must meet the requirements of ASHRAE Standard 62.2. Neither window operation nor continuous operation of central forced air system air handlers used in central fan integrated ventilation systems are permissible methods of providing whole-building ventilation.
§ 150.0(o)1A:	Field Verification and Diagnostic Testing. Whole-building ventilation airflow must be confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.7.
Pool and Spa Systems and Equipment Measures:	
§ 110.4(a):	Certification by Manufacturers. Any pool or spa heating system or equipment must be certified to have all of the following: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating.*
§ 110.4(b)1:	Piping. Any pool or spa heating equipment must be installed with at least 36 inches of pipe between the filter and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.
§ 110.4(b)2:	Covers. Outdoor pools or spas that have a heat pump or gas heater must have a cover.
§ 110.4(b)3:	Directional inlets and time switches for pools. Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.
§ 110.5:	Pilot Light. Natural gas pool and spa heaters must not have a continuously burning pilot light.
§ 150.0(p):	Pool Systems and Equipment Installation. Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves.*
Lighting Measures:	
§ 110.9:	Lighting Controls and Components. All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9.*
§ 110.9(e):	JA8 High Efficacy Light Sources. To qualify as a JA8 high efficacy light source for compliance with § 150.0(k), a residential light source must be certified to the Energy Commission according to Reference Joint Appendix JA8.
§ 150.0(k)1A:	Luminaire Efficacy. All installed luminaires must be high efficacy in accordance with TABLE 150.0-A.
§ 150.0(k)1B:	Blank Electrical Boxes. The number of electrical boxes that are more than 5 feet above the finished floor and do not contain a luminaire or other device must be no greater than the number of bedrooms. These electrical boxes must be served by a dimmer, vacancy sensor control, or fan speed control.
§ 150.0(k)1C:	Recessed Downlight Luminaires in Ceilings. Luminaires recessed into ceilings must meet all of the requirements for: insulation contact (IC) labeling; air leakage; sealing; maintenance; and socket and light source as described in § 150.0(k)1C. A JA8-2016-E light source rated for elevated temperature must be installed by final inspection in all recessed downlight luminaires in ceilings.
§ 150.0(k)1D:	Electronic Ballasts. Ballasts for fluorescent lamps rated 13 watts or greater must be electronic and must have an output frequency no less than 20 kHz.
§ 150.0(k)1E:	Night Lights. Permanently installed night lights and night lights integral to installed luminaires or exhaust fans must be rated to consume no more than 5 watts of power per luminaire or exhaust fan as determined in accordance with § 130.0(c). Night lights do not need to be controlled by vacancy sensors.
§ 150.0(k)1F:	Lighting Integral to Exhaust Fans. Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0(k).*
§ 150.0(k)1G:	Screw based luminaires. Screw based luminaires must not be recessed downlight luminaires in ceilings and must contain lamps that comply with Reference Joint Appendix JA8. Installed lamps must be marked with "JA8-2016" or "JA8-2016-E" as specified in Reference Joint Appendix JA8.*
§ 150.0(k)1H:	Enclosed Luminaires. Light sources installed in enclosed luminaires must be JA8 compliant and must be marked with "JA8-2016-E."
§ 150.0(k)2A:	Interior Switches and Controls. All forward phase cut dimmers used with LED light sources must comply with NEMA SSL 7A.
§ 150.0(k)2B:	Interior Switches and Controls. Exhaust fans must be switched separately from lighting systems.*
§ 150.0(k)2C:	Interior Switches and Controls. Luminaires must be switched with readily accessible controls that permit the luminaires to be manually switched ON and OFF.
§ 150.0(k)2D:	Interior Switches and Controls. Controls and equipment must be installed in accordance with manufacturer's instructions.
§ 150.0(k)2E:	Interior Switches and Controls. No control must bypass a dimmer or vacancy sensor function if the control is installed to comply with § 150.0(k).
§ 150.0(k)2F:	Interior Switches and Controls. Lighting controls must comply with the applicable requirements of § 110.9.
§ 150.0(k)2G:	Interior Switches and Controls. An energy management control system (EMCS) may be used to comply with dimmer requirements if it: functions as a dimmer according to § 110.9; meets the Installation Certificate requirements of § 130.4; meets the EMCS requirements of § 130.5(f); and meets all other requirements in § 150.0(k)2.
§ 150.0(k)2H:	Interior Switches and Controls. An EMCS may be used to comply with vacancy sensor requirements in § 150.0(k) if it meets all of the following: it functions as a vacancy sensor according to § 110.9; the Installation Certificate requirements of § 130.4; the EMCS requirements of § 130.5(f); and all other requirements in § 150.0(k)2.
§ 150.0(k)2I:	Interior Switches and Controls. A multiscene programmable controller may be used to comply with dimmer requirements in § 150.0(k) if it provides the functionality of a dimmer according to § 110.9, and complies with all other applicable requirements in § 150.0(k)2.

§ 150.0(k)2J:	**Interior Switches and Controls.** In bathrooms, garages, laundry rooms, and utility rooms, at least one luminaire in each of these spaces must be controlled by a vacancy sensor.
§ 150.0(k)2K:	**Interior Switches and Controls.** Dimmers or vacancy sensors must control all luminaires required to have light sources compliant with Reference Joint Appendix JA8, except luminaires in closets less than 70 square feet and luminaires in hallways.*
§ 150.0(k)2L:	**Interior Switches and Controls.** Undercabinet lighting must be switched separately from other lighting systems.
§ 150.0(k)3A:	**Residential Outdoor Lighting.** For single-family residential buildings, outdoor lighting permanently mounted to a residential building, or to other buildings on the same lot, must meet the requirement in item § 150.0(k)3Ai (ON and OFF switch) and the requirements in either item § 150.0(k)3Aii (photocell and motion sensor) or item § 150.0(k)3Aiii (photo control and automatic time switch control, astronomical time clock, or EMCS).
§ 150.0(k)3B:	**Residential Outdoor Lighting.** For low-rise multifamily residential buildings, outdoor lighting for private patios, entrances, balconies, and porches; and outdoor lighting for residential parking lots and residential carports with less than eight vehicles per site must comply with either § 150.0(k)3A or with the applicable requirements in §§ 110.9, 130.0, 130.2, 130.4, 140.7 and 141.0.
§ 150.0(k)3C:	**Residential Outdoor Lighting.** For low-rise residential buildings with four or more dwelling units, outdoor lighting not regulated by § 150.0(k)3B or § 150.0(k)3D must comply with the applicable requirements in §§ 110.9, 130.0, 130.2, 130.4, 140.7 and 141.0.
§ 150.0(k)3D:	**Residential Outdoor Lighting.** Outdoor lighting for residential parking lots and residential carports with a total of eight or more vehicles per site must comply with the applicable requirements in §§ 110.9, 130.0, 130.2, 130.4, 140.7, and 141.0.
§ 150.0(k)4:	**Internally illuminated address signs.** Internally illuminated address signs must comply with § 140.8; or must consume no more than 5 watts of power as determined according to § 130.0(c).
§ 150.0(k)5:	**Residential Garages for Eight or More Vehicles.** Lighting for residential parking garages for eight or more vehicles must comply with the applicable requirements for nonresidential garages in §§ 110.9, 130.0, 130.1, 130.4, 140.6, and 141.0.
§ 150.0(k)6A:	**Interior Common Areas of Low-rise Multi-Family Residential Buildings.** In a low-rise multifamily residential building where the total interior common area in a single building equals 20 percent or less of the floor area, permanently installed lighting for the interior common areas in that building must be high efficacy luminaires and controlled by an occupant sensor.
§ 150.0(k)6B:	**Interior Common Areas of Low-rise Multi-Family Residential Buildings.** In a low-rise multifamily residential building where the total interior common area in a single building equals more than 20 percent of the floor area, permanently installed lighting in that building must: i. Comply with the applicable requirements in §§ 110.9, 130.0, 130.1, 140.6 and 141.0; and ii. Lighting installed in corridors and stairwells must be controlled by occupant sensors that reduce the lighting power in each space by at least 50 percent. The occupant sensors must be capable of turning the light fully on and off from all designed paths of ingress and egress.
Solar Ready Buildings:	
§ 110.10(a)1:	**Single Family Residences.** Single family residences located in subdivisions with ten or more single family residences and where the application for a tentative subdivision map for the residences has been deemed complete by the enforcement agency must comply with the requirements of § 110.10(b) through § 110.10(e).
§ 110.10(a)2:	**Low-rise Multi-family Buildings.** Low-rise multi-family buildings must comply with the requirements of § 110.10(b) through § 110.10(d).
§ 110.10(b)1:	**Minimum Area.** The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other Parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single family residences the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. For low-rise multi-family buildings the solar zone must be located on the roof or overhang of the building, or on the roof or overhang of another structure located within 250 feet of the building, or on covered parking installed with the building project, and have a total area no less than 15 percent of the total roof area of the building excluding any skylight area.*
§ 110.10(b)2:	**Orientation.** All sections of the solar zone located on steep-sloped roofs must be oriented between 110 degrees and 270 degrees of true north.
§ 110.10(b)3A:	**Shading.** The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment.*
§ 110.10(b)3B:	**Shading.** Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the distance, measured in the horizontal plane, of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane.*
§ 110.10(b)4:	**Structural Design Loads on Construction Documents.** For areas of the roof designated as solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.
§ 110.10(c):	**Interconnection Pathways.** The construction documents must indicate: a location for inverters and metering equipment and a pathway for routing of conduit from the solar zone to the point of interconnection with the electrical service (for single family residences the point of interconnection will be the main service panel); and a pathway for routing of plumbing from the solar zone to the water-heating system.
§ 110.10(d):	**Documentation.** A copy of the construction documents or a comparable document indicating the information from § 110.10(b) through § 110.10(c) must be provided to the occupant.
§ 110.10(e)1:	**Main Electrical Service Panel.** The main electrical service panel must have a minimum busbar rating of 200 amps.
§ 110.10(e)2:	**Main Electrical Service Panel.** The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be: positioned at the opposite (load) end from the input feeder location or main circuit location; and permanently marked as "For Future Solar Electric".

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
John Rogers	1/20/2018
System Name	**Floor Area**
HVAC	922

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	80,000
Total Output (Btuh)	80,000
Output (Btuh/sqft)	86.8
Cooling System	
Output per System	1
Total Output (Btuh)	1
Total Output (Tons)	0.0
Total Output (Btuh/sqft)	0.0
Total Output (sqft/Ton)	11,064,000.0
Air System	
CFM per System	0
Airflow (cfm)	0
Airflow (cfm/sqft)	0.00
Airflow (cfm/Ton)	0.0
Outside Air (%)	0.0 %
Outside Air (cfm/sqft)	0.00

Note: values above given at ARI conditions

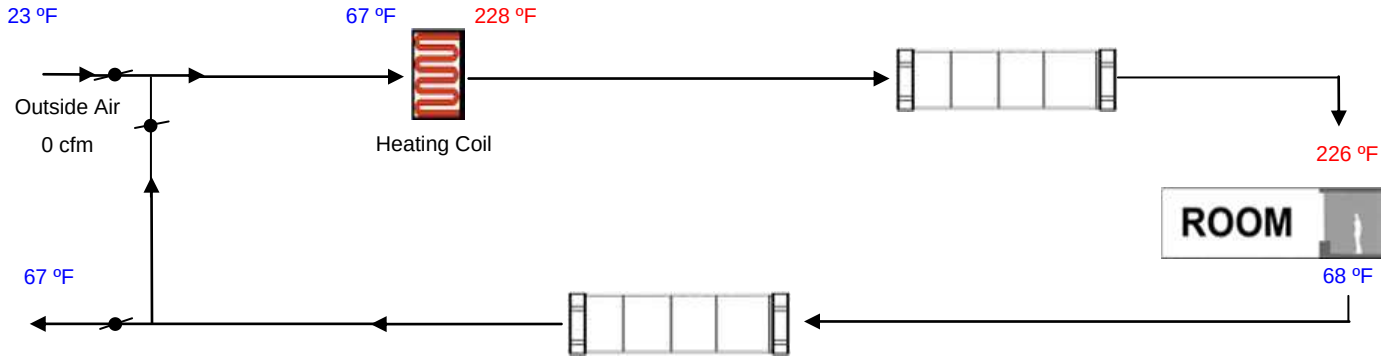
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	**Sensible**	**Latent**	**CFM**	**Sensible**
Total Room Loads	535	10,792	378	67	11,476
Return Vented Lighting		0			
Return Air Ducts		629			678
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		629			678
TOTAL SYSTEM LOAD		12,050	378		12,832

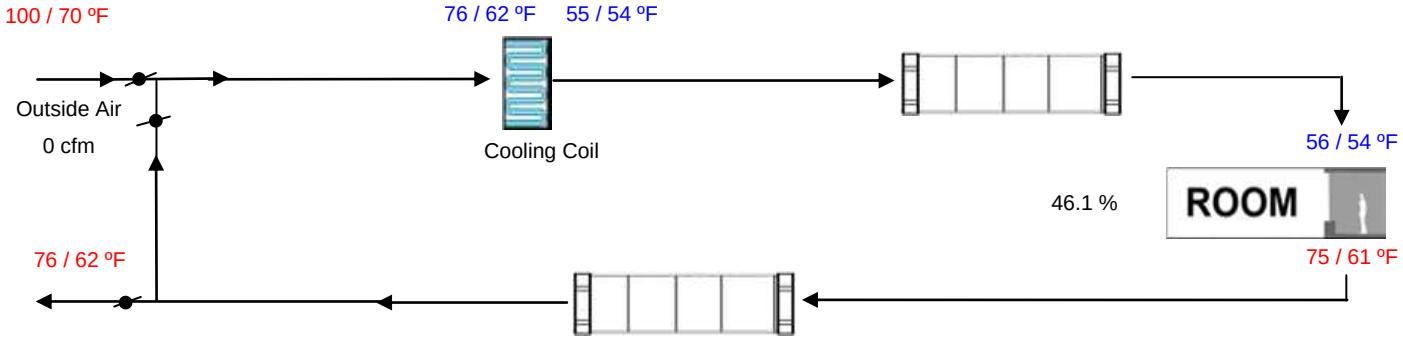
HVAC EQUIPMENT SELECTION

Standard Fau/AC	1	0		80,000
Total Adjusted System Output (Adjusted for Peak Design conditions)	1	0		80,000
TIME OF SYSTEM PEAK		Aug 3 PM		Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



ZONE LOAD SUMMARY

Project Name	Date
John Rogers	*1/20/2018*
System Name	**Floor Area**
HVAC	*922*

ZONE LOAD SUMMARY

		ZONAL SYSTEM						COOLING PEAK				HEATING PEAK	
ZONE NAME	**SYSTEM NAME**	**Mult.**	**CFM**	**Sensible**	**Latent**	**Heating**	**OA CFM**	**Peak Hr**	**CFM**	**Sensible**	**Latent**	**CFM**	**Sensible**
HOUSE		*1.0*					*0*	*Aug 3 PM*	*535*	*10,792*	*378*	*67*	*11,476*
			TOTALS	*0*	*0*	*0*	*0*	*Aug 3 PM*		*10,792*	*378*		*11,476*

(BLOCK LOAD)

ROOM LOAD SUMMARY

Project Name	Date
John Rogers	*1/20/2018*
System Name	**Floor Area**
HVAC	*922*

ROOM LOAD SUMMARY

			ROOM COOLING PEAK			COIL COOLING PEAK			COIL HTG. PEAK	
Zone Name	Room Name	Mult.	CFM	Sensible	Latent	CFM	Sensible	Latent	CFM	Sensible
HOUSE	*Total House*	*1*	*535*	*10,792*	*378*	*535*	*10,792*	*378*	*67*	*11,476*

PAGE TOTAL			*535*	*10,792*	*378*	*535*	*10,792*	*378*	*67*	*11,476*
TOTAL *			*535*	*10,792*	*378*	*535*	*10,792*	*378*	*67*	*11,476*

* Total includes ventilation load for zonal systems.

ROOM HEATING PEAK LOADS

Project Name	Date
John Rogers	*1/20/2018*

ROOM INFORMATION		DESIGN CONDITIONS	
Room Name	*Total House*	**Time of Peak**	*Jan 1 AM*
Floor Area	*922.00 ft²*	**Outdoor Dry Bulb Temperature**	*23 ºF*
Indoor Dry Bulb Temperature	*68 ºF*		

Conduction	Area		U-Value		ΔT ºF		Btu/hr
R-19 Floor Crawlspace	*922.0*	X	*0.0340*	X	*45*	=	*1,411*
R-15 Wall	*1,017.2*	X	*0.0950*	X	*45*	=	*4,348*
Double Non Metal Clear	*96.0*	X	*0.5500*	X	*45*	=	*2,376*
Wood Door	*37.8*	X	*0.5000*	X	*45*	=	*850*
R-30 Roof Attic	*1,073.0*	X	*0.0190*	X	*45*	=	*917*

Items shown with an asterisk (*) denote conduction through an interior surface to another room

Page Total *9,902*

Infiltration: [*1.00* (Schedule Fraction) X *1.078* (Air Sensible) X *922* (Area) X *8.00* (Ceiling Height) X *0.264* (ACH) / 60] X *45* (ΔT) = *1,573*

TOTAL HOURLY HEAT LOSS FOR ROOM *11,476*

RESIDENTIAL ROOM COOLING LOAD SUMMARY

Project Name	Date
John Rogers	*1/20/2018*

ROOM INFORMATION		DESIGN CONDITIONS	
Room Name	*Total House*	**Outdoor Dry Bulb Temperature**	*100 ºF*
Floor Area	*922.00 ft²*	**Outdoor Wet Bulb Temperature**	*70 ºF*
Indoor Dry Bulb Temperature	*75 ºF*	**Outdoor Daily Range:**	*36 ºF*

Opaque Surfaces	Orientation	Area		U-Factor		CLTD[1]		Btu/hr
R-19 Floor Crawlspace		*922.0*	X	*0.0340*	X	*12.0*	=	*376*
R-15 Wall	*(E)*	*175.8*	X	*0.0950*	X	*23.0*	=	*384*
Wood Door	*(E)*	*37.8*	X	*0.5000*	X	*23.0*	=	*434*
R-15 Wall	*(S)*	*324.1*	X	*0.0950*	X	*16.0*	=	*493*
R-15 Wall	*(W)*	*184.3*	X	*0.0950*	X	*23.0*	=	*403*
R-15 Wall	*(N)*	*333.0*	X	*0.0950*	X	*13.0*	=	*411*
R-30 Roof Attic	*(N)*	*1,073.0*	X	*0.0190*	X	*47.0*	=	*958*
			X		X		=	
			X		X		=	
						Page Total		*3,459*

Items shown with an asterisk (*) denote conduction through an interior surface to another room.
1. Cooling Load Temperature Difference (CLTD)

		Shaded			Unshaded			
Fenestration	**Orientation**	**Area**	**GLF**		**Area**	**GLF**		**Btu/hr**
Window- F1	*(E)*	*12.0* X *33.9*	+		*0.0* X *73.7*	=		*407*
Window-F2	*(E)*	*0.0* X *33.9*	+		*12.0* X *73.7*	=		*885*
Window-L1	*(S)*	*13.6* X *33.9*	+		*1.4* X *47.3*	=		*528*
Window-L1.2	*(S)*	*13.6* X *33.9*	+		*1.4* X *47.3*	=		*528*
Window-L2	*(S)*	*3.0* X *33.9*	+		*0.0* X *47.3*	=		*102*
Window-B1	*(W)*	*0.0* X *33.9*	+		*3.0* X *73.7*	=		*221*
Window-B2	*(W)*	*0.0* X *33.9*	+		*12.0* X *73.7*	=		*885*
Window-R1	*(N)*	*0.0* X *33.9*	+		*12.0* X *33.9*	=		*407*
Window-R2	*(N)*	*0.0* X *33.9*	+		*12.0* X *33.9*	=		*407*
						Page Total		*4,370*

Internal Gain							Btu/hr
Occupants	*2.8*	Occupants	X	*245*	Btuh/occ.	=	*678*
Equipment	*922*	Floor Area	X	*0.50*	w/sqft	=	*1,573*

Infiltration: *1.078* (Air Sensible) X *0.78* (CFM) X *33.80* (ELA) X *25* (ΔT) = *711*

TOTAL HOURLY SENSIBLE HEAT GAIN FOR ROOM *10,792*

Latent Gain							Btu/hr
Occupants	*2.8*	Occupants	X	*155*	Btuh/occ.	=	*429*

Infiltration: *4,831* (Air Sensible) X *0.78* (CFM) X *33.80* (ELA) X *-0.00040* (ΔW) = *-51*

TOTAL HOURLY LATENT HEAT GAIN FOR ROOM *429*

ENERGY USE AND COST SUMMARY — ECON-1

Project Name: *John Rogers* | Date: *1/20/2018*

Rate: **Fuel Type:** *Electricity*

	STANDARD			PROPOSED			MARGIN		
	Energy Use (kWh)	Peak Demand (kW)	Cost ($)	Energy Use (kWh)	Peak Demand (kW)	Cost ($)	Energy Use (kWh)	Peak Demand (kW)	Cost ($)
Jan	*379*	*4.9*		*372*	*4.9*		*7*	*0.0*	
Feb	*295*	*3.4*		*290*	*3.4*		*5*	*0.0*	
Mar	*314*	*3.4*		*311*	*3.4*		*2*	*0.0*	
Apr	*318*	*3.4*		*317*	*3.4*		*0*	*0.0*	
May	*346*	*3.2*		*355*	*3.4*		*-9*	*-0.2*	
Jun	*560*	*4.0*		*587*	*4.2*		*-26*	*-0.2*	
Jul	*725*	*4.4*		*755*	*4.5*		*-30*	*-0.1*	
Aug	*665*	*4.4*		*693*	*4.5*		*-28*	*-0.1*	
Sep	*498*	*4.5*		*528*	*4.6*		*-30*	*-0.1*	
Oct	*326*	*3.4*		*339*	*3.4*		*-12*	*0.0*	
Nov	*328*	*3.4*		*323*	*3.4*		*5*	*0.0*	
Dec	*362*	*3.4*		*357*	*3.4*		*6*	*0.0*	
Year	*5,116*	*4.9*		*5,227*	*4.9*		*-111*	*0.0*	
CO_2		**lbs/yr**			**lbs/yr**			**lbs/yr**	

Rate: **Fuel Type:** *Natural Gas*

	STANDARD			PROPOSED			MARGIN		
	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost ($)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost ($)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost ($)
Jan	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Feb	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Mar	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Apr	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
May	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Jun	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Jul	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Aug	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Sep	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Oct	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Nov	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Dec	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
Year	*0*	*0.0*		*0*	*0.0*		*0*	*0.0*	
CO_2		**lbs/yr**			**lbs/yr**			**lbs/yr**	

Annual Totals	Energy	Demand	Cost	Cost/sqft	Virtual Rate
Electricity	*5,227* **kWh**	*5* **kW**	**$** *0*	**$** *0.00* **/sqft**	**$** *0.00* **/kWh**
Natural Gas	*0* **therms**	*0* **kBtu/hr**	**$** *0*	**$** *0.00* **/sqft**	**$** *0.00* **/therm**
		Total	**$** *0*	**$** *0.00* **/sqft**	

Avoided CO_2 Emissions: ***0*** **lbs/yr**

Energy Upgrade Recommendations ECON-2

Project Name *John Rogers*	Documentation Author *CICC*
Project Address *420 1ST STREET COLUSA, CA 95932*	Author Address ,

Recommended Improvements	Description	Annual Savings	Est. Cost to Install	Savings	
				Site	TDV

Annual Results	Energy Cost			Electricity (kWh)			Fossil Fuel (therms)		
End Use	Existing	Improved	Savings	Existing	Improved	Savings	Existing	Improved	Savings
Space Heating	*$0*			*80*			*0*		
Space Cooling	*$0*			*1,495*			*0*		
Fans	*$0*			*0*			*0*		
Pumps	*$0*			*0*			*0*		
Domestic Hot Water	*$0*			*0*			*0*		
Indoor Lighting	*$0*			*264*			*0*		
Outdoor Lighting	*$0*			*57*			*0*		
Plug Loads	*$0*			*1,681*			*0*		
Appliances/Ancillary	*$0*			*1,651*			*0*		
Renewables	*$0*			*0*			*0*		
TOTAL	***$0***			***5,227***			***0***		

CO_2 (lbs/year)	Existing	Improved	Savings
Electricity	*0*		
Fossil Fuel	*0*		
TOTAL	***0***		
Average Demand (kW)	*2.49*		
TDV Energy (kBtu/ft^2-yr)	*204.93*		

Climate Zone:	*11*
Electric Rate:	
Gas Rate:	
Floor Area:	*922*
Type:	*Single Family*

The estimated operating costs shown in this report are dependent upon many factors. The construction and conservation features of the project clearly are important. Equally important is the thermostat setting. How the thermostat is used, appliance use, and occupant interaction all influence the annual operating cost. The estimates provided in this report are based on typical conditions; your actual usage will vary.

Project Summary

420 1ST STREET

COLUSA, CA 95932

Date of Audit:	*1/1/0001*
Conditioned Floor Area:	*922*
Number of Stories:	*1*
Number of Bedrooms:	*2*

House Type:	*Single Family*
Foundation Type:	*Raised Floor*
Climate Zone:	*11*
Weather Data:	*CZ11_wy3.bin*

WHERE THE ENERGY IS USED

No Data

This pie chart estimates the energy cost for the various types of end uses in the home. Data has been calculated using software that uses typical profiles of usage to estimate end use cost. Your costs may vary from these numbers depending upon how the home is operated.

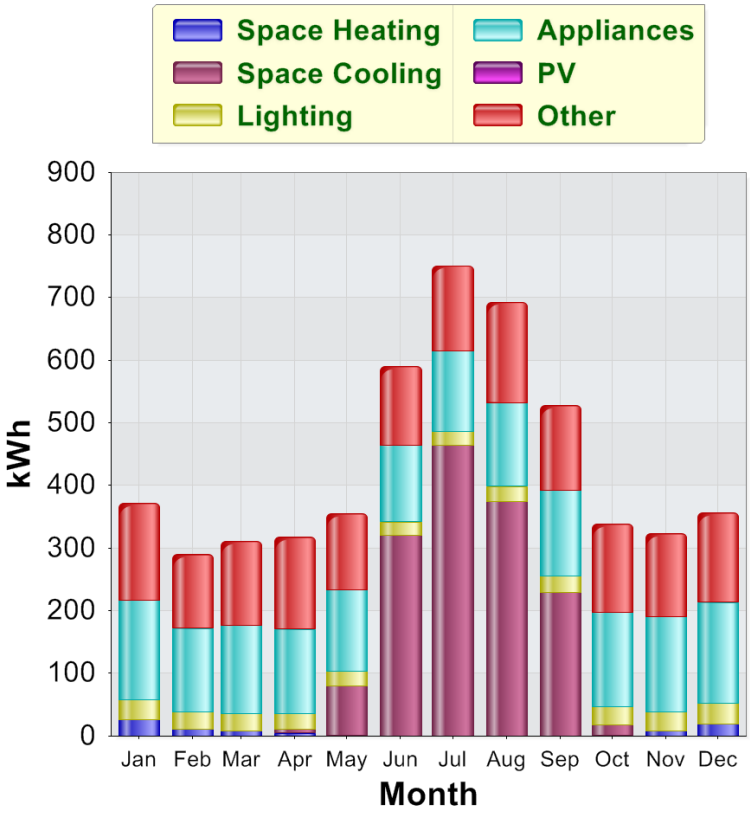
Energy Use Summary

420 1ST STREET
COLUSA, CA 95932

The tables and graphs below summarize the major energy uses in the home for both electricity and fossil fuels. Ancillary uses include swimming pools and spas.

ELECTRICITY

End Use	kWh/yr
Space Heating	*80*
Space Cooling	*1,495*
Fans	*0*
Pumps	*0*
Domestic Hot Water	*0*
Indoor Lighting	*264*
Outdoor Lighting	*57*
Plug Loads	*1,681*
Appliances/Ancillary	*1,651*
Renewables	*0*
TOTAL	***5,227***



FOSSIL FUEL

End Use	Therms/yr
Space Heating	*0*
Domestic Hot Water	*0*
Appliances	*0*
Ancillary	*0*
TOTAL	***0***