

Guide to Energy & Carbon Data Entry in the AIA Common App For Buildings Permitted in California

THE BACKSTORY

The purpose of the AIA Common App is to **collect evidence** for awards juries about the claims made about a building's overall performance expressed in visual materials. **An Architect or other design team member is the best person to complete the Common App.** The Common App collects three types of information in each of the 10 elements of the AIA Framework or Design Excellence:

1. **Narratives.** This is your opportunity to demonstrate specific accomplishments, quantitative or qualitative. Contextual factors and details add credibility for reviewers who are trying to link intent with reality.
2. **Yes/No questions.** These are rough, more empirical, indicators of where a design team focused attention. The answers to these generate the spider graph at the top of the Common App. It is important to note that **these are not judging criteria** and the resulting **spider graph is not the basis for Common App or Jury review.** It does not help an application to stretch the truth in answering these.
3. **Quantitative Data.** The Common App asks you to enter the amount of **Energy** your building uses, or is predicted to use (Measure 6), and estimate its **Embodied Carbon** (Measure 8). **Common App reviewers and jurors rely on this data** because energy and carbon are among the most important ways – and certainly the easiest to quantify – that a building makes an imprint on the world.

Many entrants complete the data incorrectly. But this won't be you because you opened this!

PROJECT INFORMATION

The Common App will automatically calculate a “Benchmark EUI” Energy Use Intensity (EUI) and Predicted EUI based on data you enter under **Building use** and **Total Floor Area**. The auto-generated benchmark value is supposed to approximate what the median building of the same type would have used in 2003, the origin year for the 2030 challenge. Total Floor Area should equal the gross square footage of the project excluding any structured parking. If you are confused about whether any other areas should be included or excluded in an EUI calculation, consult [EPA Portfolio Manager](#).

Building use	Primary building use Percent of total area	Additional building use Percent of total area (if any)	Additional building use Percent of total area (if any)
Project Scope			
Number of Stories			
Total Floor Area			
Site Area			
Floor Area Ratio			

Building Type	Percentage of total GSF
Residential - Multi	100%
	100%

New Construction	
5	
80,949	GSF
20,290	SF
3.99	

The data you enter regarding **number of occupants** and **project cost** do not figure into energy and carbon but will also be used under Measure 5 - Design for Economy - to help reviewers evaluate sufficiency and cost-efficiency.

Measure 6. Design For Energy

BENCHMARKING

What Energy Code was the project designed to meet?

Buildings built to code minimum today can “claim” some degree of savings above the 2030 Commitment “Benchmark EUI” (see previous section). California energy code is strong and is doing a lot of work for us toward that commitment. First make sure you know whether your building complies with code using the **prescriptive path** (you checked all the boxes, but didn’t model the building) or **performance path** (you created an energy model).

- **Prescriptive path**

If this is you, select your building’s applicable energy code from the drop-down, and then indicate that energy performance is being **tracked “it’s not/ Energy Code Minimum”** and you’re done.

- **Performance path** (or if you have actual usage data)

For many California projects, meeting code means creating an energy model! So your project has been “**simulated**.” The results are on your T24 report. Proceed to the next section.

BENCHMARKING		INPUTS		UNITS / D
Energy Code that the project was designed to meet?		California Title 24 2016		kBtu/sf/yr
Benchmark EUI		79.0		kBtu/sf/yr
Estimated EUI based on applicable energy code		41.1		kBtu/sf/yr
Is the building all-electric, except for emergency power supply?		Yes		
How is energy performance being tracked and recorded for this project?		Simulated (Energy Model)		

Note: The 2024 Version of the Common App does not include T24 2022 in the drop-down. If you don't see your energy code, select the closest one, and make a note in your energy narrative if needed.

ANNUAL ENERGY CONSUMPTION

Fill in the total amount of energy the building will consume in one year. **The best energy consumption data to report here is actual data collected from utility bills.** But many projects don't have actual data and must enter the predicted energy use from an energy model. Both T24 compliance models and models using other tools are acceptable sources for this data. However, because T24 is a compliance tool only, **non-compliance models tend to be more informative and accurate.** Find the annual energy use for each fuel type from the model output and enter the values directly into the Common App (ensure that you've selected the correct units in the drop-down!).

ANNUAL ENERGY CONSUMPTION					
Fill in the total energy CONSUMED by fuel type and identify the units of measurement. Use the dropdown menu to make selections where available.					
Fuel Type	Units	Amount	Total Energy (kBtu/yr)	Total Op. Carbon (kg-CO ₂ e/yr)	
Electricity	kWh	343095	1,170,688	132,648	
Natural Gas	Therms		0	0	
District Steam / Hot Water	kLbs		0	0	

Note: this is the same data you must enter into the AIA DDX tool for 2030 Commitment Reporting!

Finding modeled energy use in T24 forms

Energy code compliance is based on a metric called Time Dependent Valuation (TDV). This is not what a building is predicted to use; it incorporates a series of other factors. **No matter the version of T24 form you have, DO NOT report TDV data. You want to find the section that reports "site use"** – the amount of electricity (and other fuels) the building is expected to pull from the grid, expressed in **MWh** (electricity) and **MBtu** (natural gas). Here is where to find that data based on your code year. If you don't see these forms in the documents you have, simply ask your energy modeler to print them.

For single-family projects, refer to [this appendix](#)

Energy Code Year	Where to find "site use"
2013	NRCC-PRF-01-E Table U
2016	NRCC-PRF-01-E Table U
2019	NRCC-PRF-01-E Table C3
2022	NRCC-PRF-E Table C7

Example T24 2019 Site Use Table (NRCC-PRF-01-E Table C3)

C3. ENERGY USE SUMMARY						
Energy Component	Standard Design Site (MWh)	Proposed Design Site (MWh)	Margin (MWh)	Standard Design Site (MBtu)	Proposed Design Site (MBtu)	Margin (MBtu)
Space Heating	—	—	—	24.2	24.2	0.0
Space Cooling	9.9	9.9	0.0	—	—	—
Indoor Fans	20.3	20.3	0.0	—	—	—
Heat Rejection	—	—	—	—	—	—
Pumps & Misc.	—	—	—	—	—	—
Domestic Hot Water	1.7	1.7	0.0	—	—	—
Indoor Lighting	7.4	7.4	0.0	—	—	—
Compliance Total	39.3	39.3	0.0	24.2	24.2	0.0
Receptacle	23.6	23.6	0.0	—	—	—
Process	—	—	—	—	—	—
Other Uti	—	—	—	—	—	—
Process Motors	—	—	—	—	—	—
TOTAL	62.9	62.9	0.0	24.2	24.2	0.0

Electricity Energy (MWh)

Nat Gas Energy (MBtu)

Example T24 2022 Site Use Table (NRCC-PRF-E Table C7)

C7. ENERGY USE SUMMARY						
Energy Component	Standard Design Site (MWh)	Proposed Design Site (MWh)	Margin (MWh)	Standard Design Site (MBtu)	Proposed Design Site (MBtu)	Margin (MBtu)
Space Heating	9.9	14.7	-4.8	—	—	—
Space Cooling	0.6	0.7	-0.1	—	—	—
Indoor Fans	51.3	37	14.3	—	—	—
Heat Rejection	—	—	—	—	—	—
Pumps & Misc.	0.4	0.7	-0.3	—	—	—
Domestic Hot Water	104.8	60	44.8	—	—	—
Indoor Lighting	35.8	42	-6.2	—	—	—
Flexibility	—	—	—	—	—	—
EFFICIENCY TOTAL	202.8	155.1	47.7	0	0	0
Photovoltaics	-175.6	-145.9	29.7	—	—	—
Batteries	2.6	—	—	—	—	—
ENERGY USE SUBTOTAL	29.8	9.2	20.6	0	0	0
Receptacle	117.1	117.1	0	—	—	—
Process	111.5	111.6	-0.1	—	—	—
Other Uti	14.9	14.9	0	—	—	—
Process Motors	—	—	—	—	—	—
ENERGY USE TOTAL	273.3	252.8	20.5	0	0	0

ANNUAL ENERGY PRODUCTION

ANNUAL ENERGY CONSUMPTION*
*includes unregulated loads but not solar PV

CA Building Energy Compliance

Report Version: 2022.0.000
Schema Version: rev 20220601

Report Generated: 2024-07-10 16:44:30
Compliance ID: EnergyPro-3074-0724-0190

Watch your units

The units in the Common App default to **kWh** for electricity and **therms** for natural gas, but **MWh** and **MBtu** can be selected from the drop-down menu. You don't have to do any conversions.

All-electric projects prior to T24 2022

For reasons not worth getting worked up about, some all-electric projects permitted under the 2019 code and prior may still show natural gas use in their T24 report (Table C3). If this appears to be the case, you can deal with this one of two ways.

1. Work with your energy modeler to convert the gas to electricity using assumed efficiency factors for the gas system that you were forced to model and the heat pump you actually designed.
2. Make it easy on yourself: report what's in the T24 report and simply include a sentence in your narrative explaining the discrepancy. Detailing the systems used on the project in the first narrative will also give reviewers confidence about what was actually achieved in design.

Pro-tip: Do not indicate the building is all-electric but also include gas use in your reported energy consumption without an explanation in your narrative!

EUI Check

Before moving on, **take a look at the predicted EUI** automatically calculated for you. How does it compare to the benchmark and code-minimum EUI above? Is it in the ballpark? For typical buildings, EUIs are probably between 20 and 200 kbtu/SF-year depending on the use. EUIs below 20 before adding PV are not necessarily believable, and if you're around or above your benchmark EUI something is probably off (hopefully!). If the number looks funky, try the following:

- **Check your units** again. Although you shouldn't need it, here is a [conversions table](#) for energy units.
- Did you include **all fuels**?
- Is your **"building use"** in the first section correctly selected? This may throw off the benchmark EUI that is automatically presented. If you don't see a great match for your building type or don't believe the benchmark, it's okay to simply do your own gut-check on what to consider a reasonable energy use intensity.
- EUI includes **gross square footage** in the denominator. There could be something amiss in the area you reported in the very first section. Remember to exclude structured parking in your square footage per [EPA standards](#). The area should be similar to the sum of conditioned and unconditioned areas on the first page of your Title 24 Report.
- If there appears to be an **excel-related problem**, it could be because you answered questions out of order. Always start a new common app from scratch rather than a "save-as" from another project, and answer the questions in Measure 6 in order.
- **T24 2022 forms now provide EUI** in Table C8! Although you can't override the EUI fields in the Common App with these values, they are a very useful check.

CBL ENERGY USE INTENSITY (EUI)				
	Standard Design (kBtu/ft ² / yr)	Proposed Design (kBtu/ft ² / yr)	Margin (kBtu/ft ² / yr)	Margin Percentage
GROSS EUI ¹	26.82	23.82	3	11.19
NET EUI ¹	16.33	15.1	1.23	7.53

¹ Notes: Gross EUI is Energy Use Total (not including PV)/Total Building Area. Net EUI is Energy Use Total (including PV)/Total Building Area.

ANNUAL ENERGY PRODUCTION

If you do not have renewable energy (virtually always meaning solar PV) on your project, select “not included” in the drop down and you’re done.

If you do have renewable energy, you can select “**planned**” to enter predicted generation (even if the PV is technically installed). Where does this data come from?

- T24 2022 forms Table C7 includes annual production from Solar PV.
- Solar providers often include the size of the array (**kW**) in their design documentation. **They do not always include what you need for this form:** the total amount of energy expected to be generated in a year (**kWh**). So, first ask your solar provider for this.
- Or, you can use the [NREL PVwatts calculator](#) to estimate PV generation (kWh) based on either the capacity of the array (kW) you were given, or the area. It’s a very quick and easy tool to use.

ANNUAL ENERGY PRODUCTION

Is ON-SITE renewable energy system installed, planned, or not included for the project?
How is ON-SITE renewable energy production metered by the project's utility company?

Installed

Gross Metered

Fill in the total energy PRODUCED by fuel type and identify the units of measurement. Use the dropdown menu to make selections where available.

Renewable Energy Type	Units	Amount	Total Energy (kBtu/yr)	Total Op. Carbon (kg-CO ₂ e/yr)
On-Site Total Produced	kWh	150934	515,008	58,354

Measure 8. Design For Resources

TOTAL PREDICTED EMBODIED CARBON

Did the project reuse an existing structure?

What percent of the existing structure was reused?

Identify the primary structural system

Was a whole building environmental Life Cycle Analysis (LCA) conducted?

Provide total predicted embodied carbon results.

Were design strategies implemented to substantially reduce material or embodied carbon?

If yes, please select from the following:

Was local and/or recycled content a major criterion for material selection?

Was wood used on this project FSC certified?

INPUTS

UNITS / DE

kg-CO₂e

You are basically done with data after completing Measure 6. However, Measure 8 sneaks in a number of questions about the nature of the building’s construction and an estimate of its embodied carbon. The form is not asking for detailed accounting of building materials, so this is actually not very onerous.



Now there are tools available that can help you estimate whole-building greenhouse gas emissions that are free, quick to use with no special knowledge, and can be pretty informative. Once you enter basic project information, these tools will provide an estimate of embodied carbon in kg-CO₂e as requested in line 5.

- [EPIC / c.scale](#)
- [CARE tool](#)

Appendix

Additional guidance for single family residential projects (projects permitted since 1/1/2014)

ANNUAL ENERGY CONSUMPTION

EnergyPro v6.x Software (2013 CEC)

Request the “**Econ-1**” form for the building’s predicted yearly electrical (**kWh**) and gas (**therms**) values. This data is located at the bottom of the page. Input the total kWh and therms directly into the Common App.

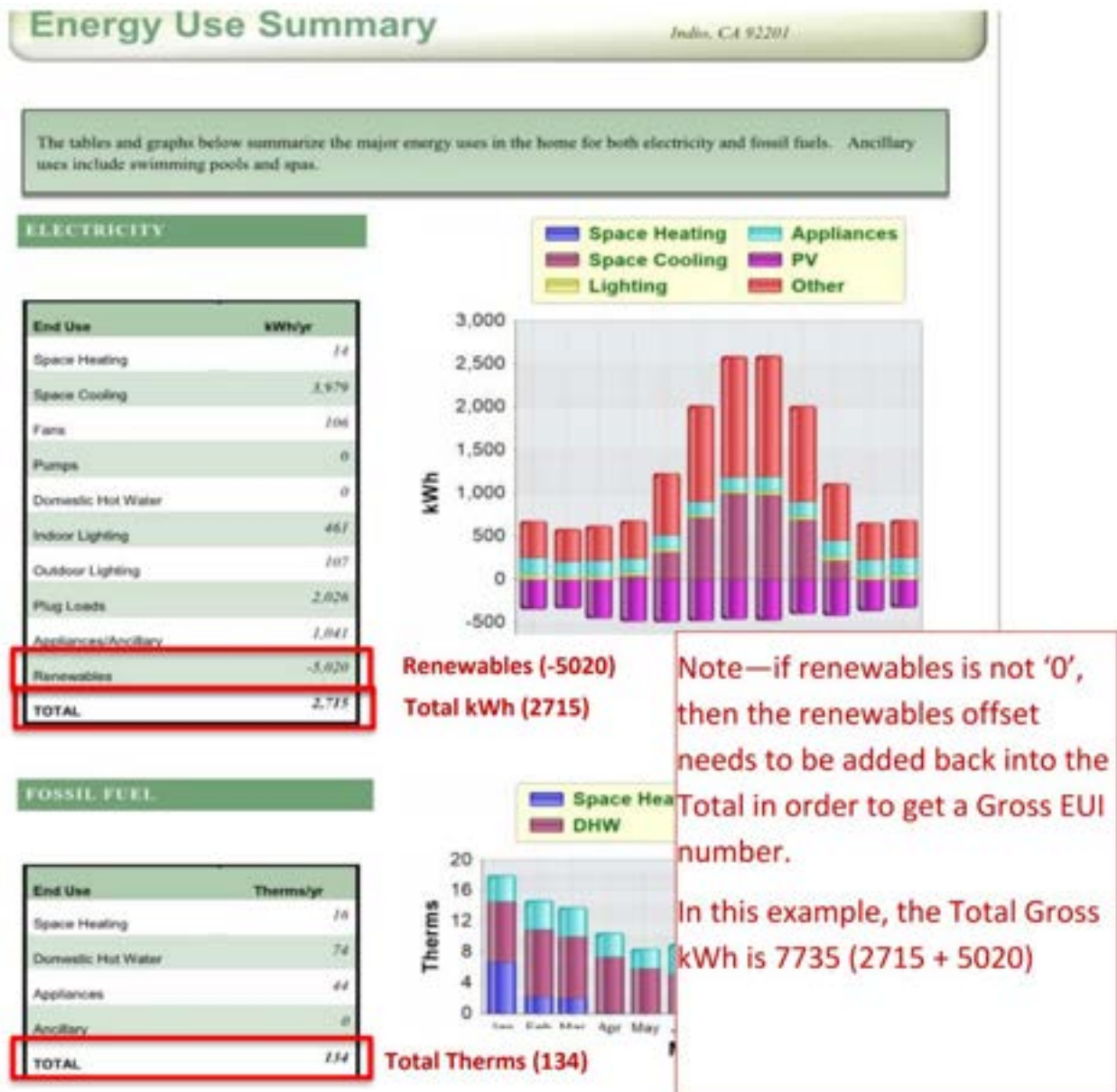
ENERGY USE AND COST SUMMARY						
Project Name Sample Residence						
Rate: Electric Alameda H						
	STANDARD			PROPOSED		
	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)
Jan	439	1.1	50	433	1.1	50
Feb	371	1.0	43	366	1.0	43
Mar	380	1.0	44	378	0.9	44
Apr	349	1.8	41	342	1.0	40
May	366	3.0	43	339	1.9	40
Jun	384	2.4	45	337	1.7	40
Jul	564	3.2	77	478	2.2	61

Scroll to Bottom

Annual Totals	Energy	Demand	Cost	Co
Electricity	5,019 kWh	3 kW	\$ 809	\$
Natural Gas	212 therm	35 kBtu/hr	\$ 263	\$
Total			\$ 872	\$

EnergyPro v7.x – v9.x Software (2016, 2019 & 2022 CEC)

For projects permitted under the 2016 code cycle and beyond, we're going to use the 'Energy Use Summary' report instead because, unlike version 6, the ECON-1 report in version 7 and above will indicate **Net Site Energy**, and not **Gross Site Energy**.



CBECC-Res 2013 & 2016 Software (2013 & 2016 CEC)

Request from the Title 24 compliance consultant a screenshot of the “Energy Use Details” display window which provides the building’s a breakdown of the building’s predicted annual energy use, including electrical (kWh) and gas (therms) values. This data is located at the bottom right of the display window under the “Proposed Design Site (kWh or therms)” columns. Input the total kWh and therms into the EUI calculator.

1storyExample20 - 1 Story Example Rev 20

End Use	Standard Design Site (kWh)	Standard Design Site (therms)	Standard Design (kTDOV/ft ² -yr)	Proposed Design Site (kWh)	Proposed Design Site (therms)	Proposed Design (kTDOV/ft ² -yr)	Compliance Margin (kTDOV/ft ² -yr)
Space Heating	202	235.3	22.20	217	246.6	23.19	-0.99
Space Cooling	429		14.62	258		8.05	6.57
IAQ Ventilation	112		1.13	112		1.13	0.00
Other HVAC			0.00			0.00	0.00
Water Heating		173.8	13.33		173.8	13.33	0.00
PV Credit						0.00	0.00
Compliance Total			51.28			45.70	5.58
Inside Lighting	1,045		11.16	1,045		11.16	10.9 %
Appl. & Cooking	958	52.5	13.80	958	52.5	13.80	
Plug Loads	2,206		22.73	2,206		22.73	
Exterior	117		1.16	117		1.16	
TOTAL	5,069	461.5	100.13	4,913	472.9	94.55	

kWh therms

Result: **PASS**

Done

CBECC-Res 2019 & 2022 Software (2016, 2019 & 2022 CEC)

Request from the Title 24 compliance consultant a screenshot of the “Energy Use Details” display window which provides the building’s a breakdown of the building’s predicted annual energy use, including electrical (kWh) and gas (therms) values. This data is located at the bottom right of the display window under the “Proposed Design Site (kWh or therms)” columns. Input the total kWh and therms into the EUI calculator.

Sample Project 2019 - Title 24 Analysis

Compliance Summary | CO2 Emissions | Energy Design Rating | **Energy Use Details** | CO2 Details

Select “Energy Use Details” Tab

End Use	Standard Design Site (kWh)	Standard Design Site (therms)	Standard Design (kTDV/ft²-yr)	Proposed Design Site (kWh)	Proposed Design Site (therms)	Proposed Design (kTDV/ft²-yr)	Compliance Margin (kTDV/ft²-yr)
Space Heating	57	84.7	8.37	93	116.4	11.58	-3.21
Space Cooling	605		20.92	606		20.61	0.31
IAQ Ventilation	215		2.39	215		2.39	0.00
Water Heating	1,024		10.54	897		9.11	1.43
Self Util/Flexibility Credit						0.00	0.00
Compliance Total			42.22				
Photovoltaics	-4,645		-42.26	-4,659 *			
Battery							
Flexibility							
Inside Lighting	561		6.95	561			
Appl. & Cooking	951	42.5	14.33	956	42.5	14.39	
Plug Loads	2,026		23.29	2,026		23.29	
Exterior	136		1.58	136		1.58	
TOTAL	929	127.2	46.11	831	159.0	47.25	

Generation Coincident Peak Demand (kW): Standard Design: 2 Net kWh therms Reduction: 0.05

* PV System resized to 2.80 kWdc (a factor of 2.804) to achieve “Substantially Greater” energy efficiency

Calculate Gross kWh by adding PV production back into Net kWh.

Example:

831[Net kWh] + 4659 [PV kWh] = 5490 [Gross kWh]