



TRI-COUNTY  
REGIONAL ENERGY NETWORK  
SAN LUIS OBISPO • SANTA BARBARA • VENTURA



# Ask the Experts: Load Calculations

*Judy Rachel - Home Performance Pro*

March 12, 2026



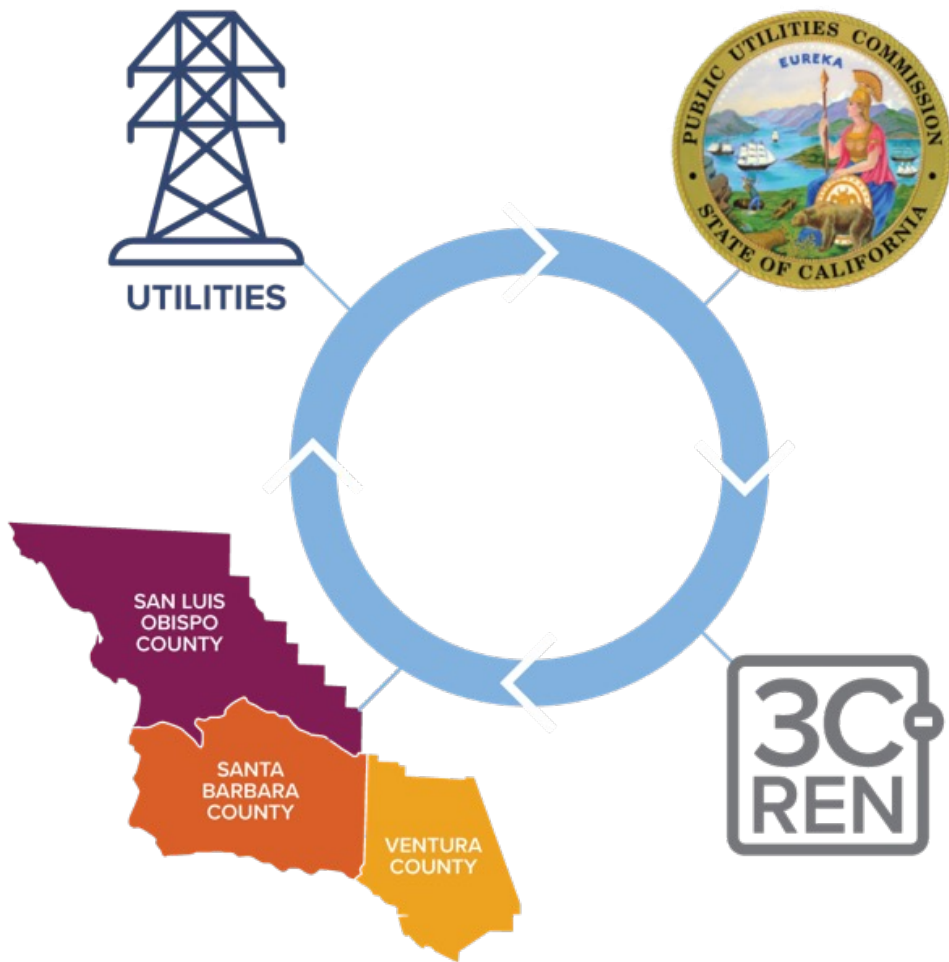


### How today's training will work:

- **Raise your hand** or **add questions to the chat** to participate
- Questions will be addressed in the order they are submitted, **starting with those with their hand raised**
- Slides/recording will be **shared** after the event

\*Please Note: 3C-REN does **not** allow **AI notetakers**, unless used to accommodate a disability





## Tri-County Regional Energy Network

3C-REN is a collaboration between the tri-counties

Our programs reduce energy use for a more sustainable, equitable and economically vibrant Central Coast

Our free services are funded via the CPUC, bringing ratepayer dollars back to the region



# Our Services

## Incentives



**HOME  
ENERGY  
SAVINGS**

[3c-ren.org/for-residents](https://3c-ren.org/for-residents)  
[3c-ren.org/multifamily](https://3c-ren.org/multifamily)



**COMMERCIAL  
ENERGY  
SAVINGS**

[3c-ren.org/commercial](https://3c-ren.org/commercial)

Contractors can enroll at  
[3c-ren.org/contractors](https://3c-ren.org/contractors)

## Training



**BUILDING  
PERFORMANCE  
TRAINING**

[3c-ren.org/events](https://3c-ren.org/events)  
[3c-ren.org/building](https://3c-ren.org/building)



**ENERGY  
CODE  
CONNECT**

[3c-ren.org/code](https://3c-ren.org/code)

View past trainings at  
[3c-ren.org/on-demand](https://3c-ren.org/on-demand)

## Technical Assistance



**AGRICULTURE  
ENERGY  
SOLUTIONS**

[3c-ren.org/agriculture](https://3c-ren.org/agriculture)

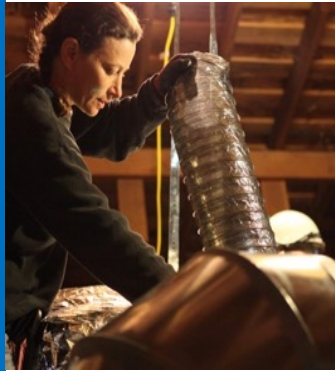


**ENERGY  
ASSURANCE  
SERVICES**

[3c-ren.org/assurance](https://3c-ren.org/assurance)



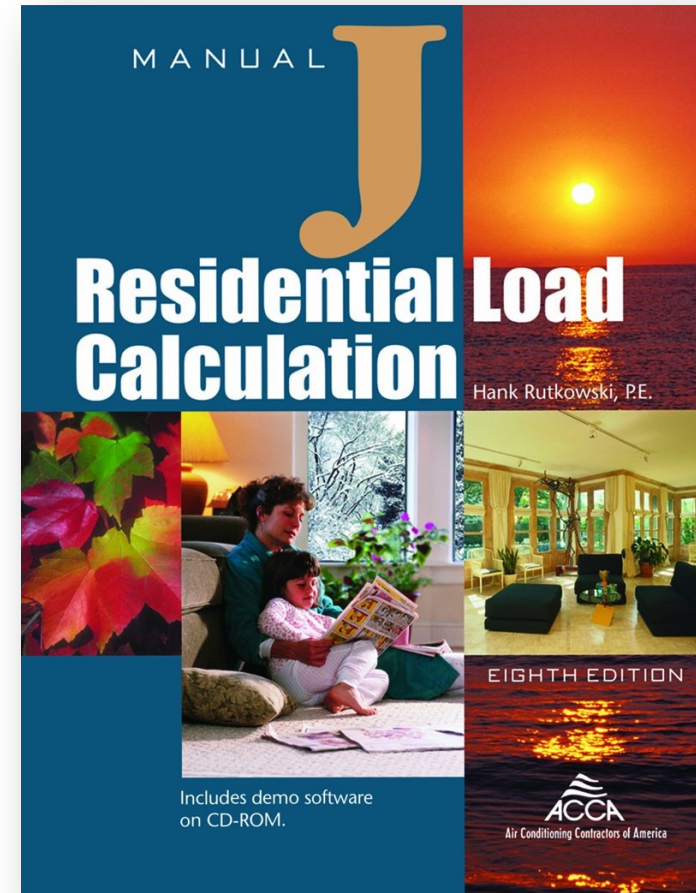
# PRESENTER – JUDY RACHEL



1. Home Performance Technician
2. Contractor Field Mentor
3. Perform load calculations and HVAC system design
4. Field Research/Building Performance Testing
5. Diagnostic testing of existing HVAC systems
6. Trainer for Home/High Performance Homes, ACCA load calculations, Healthy Homes, use of diagnostic test equipment, combustion safety, etc.

# AGENDA

- ❑ *What a Load Calculation is*
- ❑ ACCA Manual J
- ❑ Questions about Load Calculations

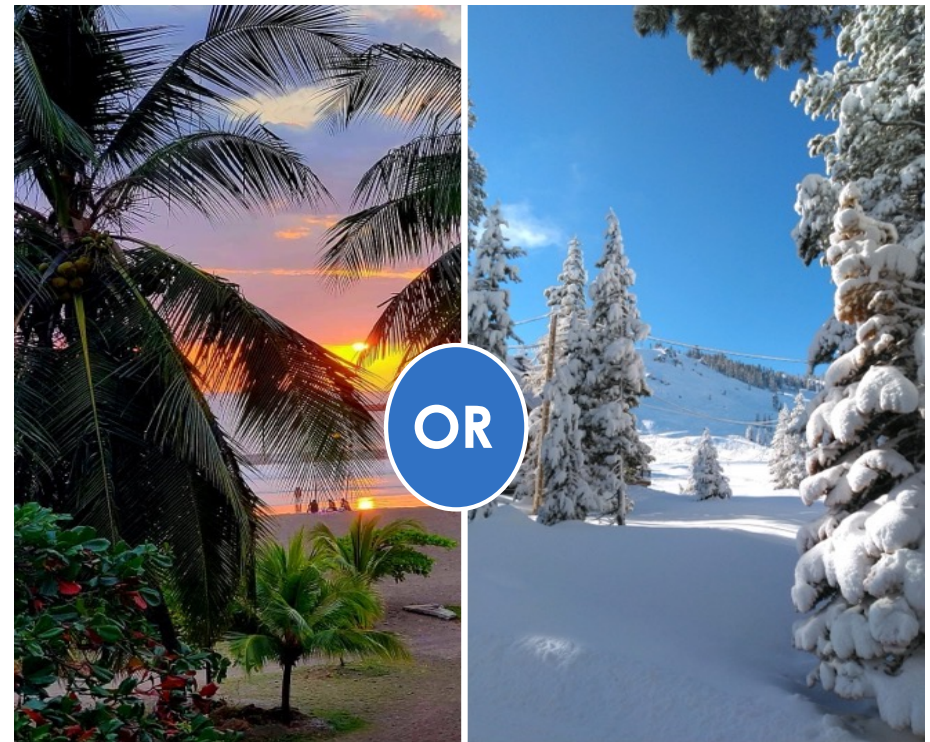


# WHAT IS A HEATING AND COOLING LOAD CALCULATION?

The measure of energy the heating and / or cooling system needs to add or remove from a space to provide the desired level of comfort



# BUILDINGS ARE ENVIRONMENTAL SEPARATORS



# GOAL OF THE LOAD CALCULATION

Provide the information necessary to select appropriately sized space conditioning equipment.

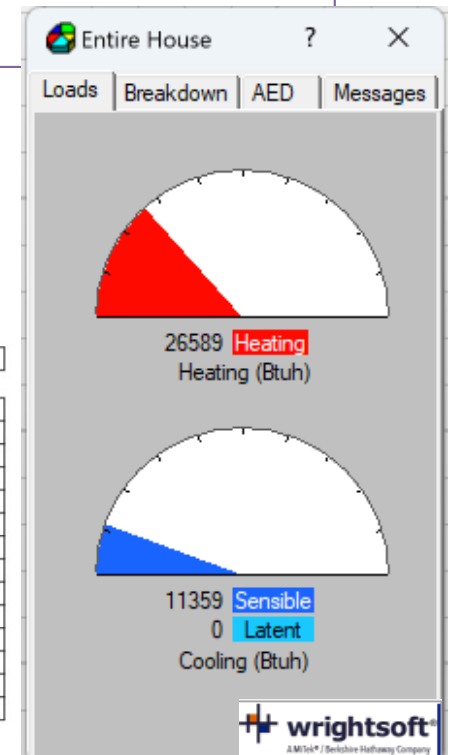
## 4-2. Heating capacity

**NOTE:** Values mentioned in the table are calculated based on the maximum capacity.

■ Model: **AMUG24LMAS**

		AFR		CFM						800			
		°FDB		60		65		70		72		75	
Outdoor temperature	°FDB	°FWB	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	
			kBtu/h	kW	kBtu/h	kW	kBtu/h	kW	kBtu/h	kW	kBtu/h	kW	
-5	-7		21.24	3.84	20.64	3.90	20.50	3.49	20.08	4.01	20.34	4.06	
5	3		24.03	3.29	22.91	3.37	23.00	3.47	23.38	3.51	24.33	3.58	
14	12		25.97	3.31	24.64	3.40	24.93	3.40	25.46	3.56	26.67	3.64	
17	15		26.69	3.25	25.34	3.34	25.60	3.38	26.13	3.50	27.36	3.57	
23	19		28.07	3.18	26.76	3.26	26.86	3.33	27.31	3.40	28.42	3.47	
32	28		30.13	3.14	29.06	3.19	28.80	3.26	28.81	3.29	29.50	3.34	
41	37		32.20	3.16	31.51	3.18	30.73	3.20	30.09	3.21	30.12	3.23	
47	43		33.59	3.21	32.81	3.20	32.00	3.15	31.20	3.18	30.39	3.17	
50	47		34.42	3.28	34.22	3.25	32.82	3.16	31.37	3.20	30.59	3.18	
59	50		34.72	3.39	35.05	3.30	33.09	3.04	30.85	3.15	29.27	3.08	

29.23 @34F OAT / 70F IDT

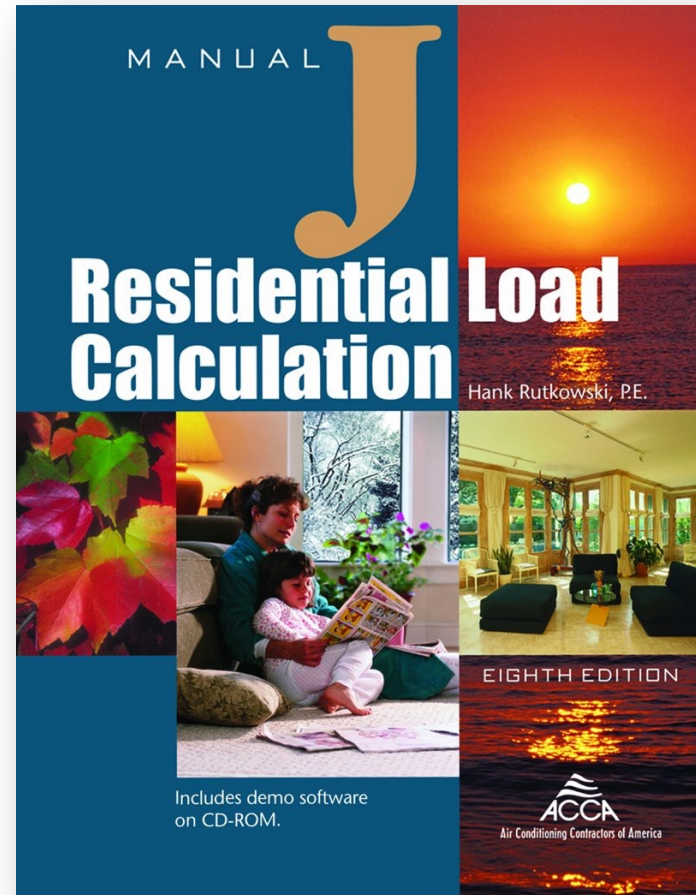


# AGENDA

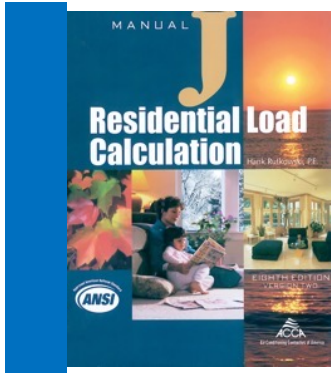
✓ What a Load Calculation is

❑ *ACCA Manual J*

❑ Questions about Load Calculations

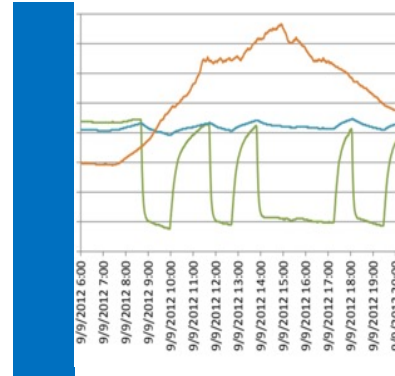


# LOAD CALCULATION PROCEDURES



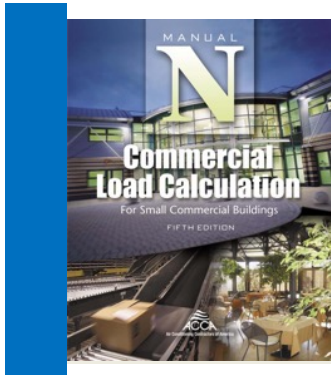
## Manual J Residential Load Calculation

Manual J 8th Edition is the national ANSI-recognized standard for producing HVAC equipment sizing loads for single-family detached homes, small multi-unit structures, condominiums, town houses, and manufactured homes.



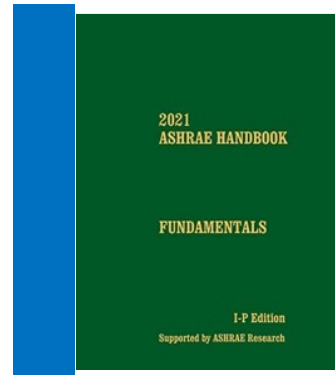
## Measured Performance Load Calculation Method

Uses live measurements in the building to calculate the heating and cooling Btu/h needed to provide the desired indoor temperature at determined design conditions.



## Manual N Commercial Load Calculation

Manual N details the load calculation procedure in the commercial construction industry.



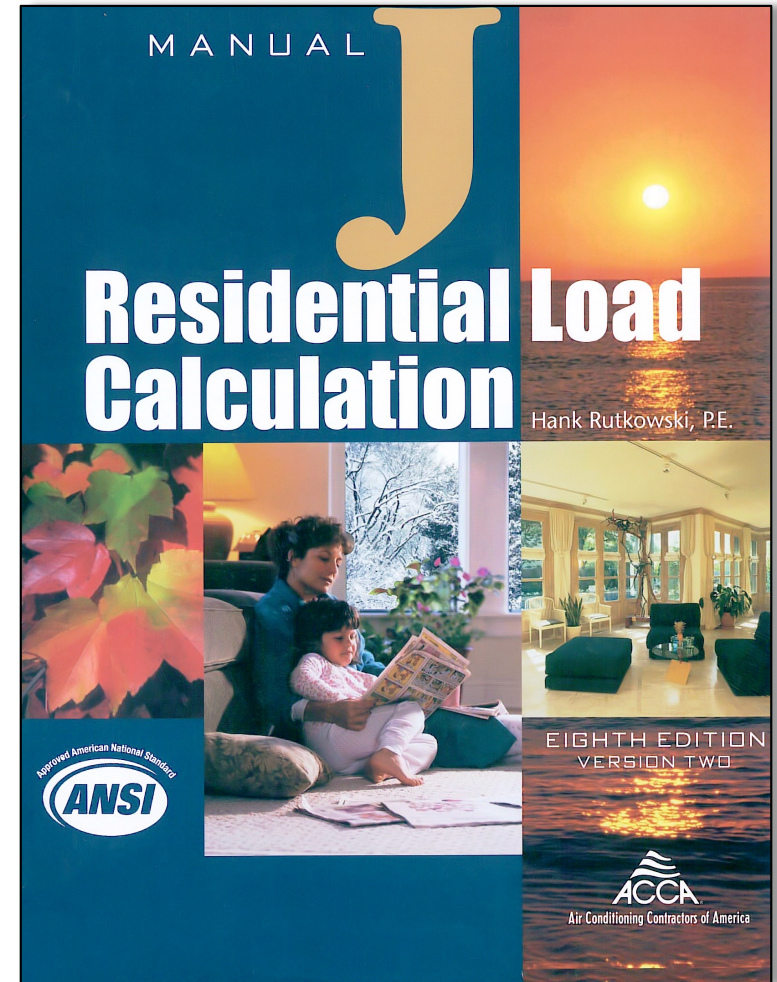
## ASHRAE HANDBOOK FUNDAMENTALS

To provide the engineer, the architect and contractor alike, with a useful and reliable reference data book relating to the art of heating and ventilating. A wide range of data within the scope of the field is presented and every effort has been made to present the material in a practical and useful manner.

# ANSI Recognized Standard

*Manual J* 8th Edition Version Two is the ANSI-recognized standard for producing HVAC equipment sizing loads for:

- Single-family detached homes
- Small multi-unit structures
- Condominiums
- Town houses
- Manufactured homes



# Manual J is not to be used for the following types of buildings

*Manual J* has no sensitivity to structural attributes of:

- Earth berm or earth covered dwellings
- Homes with passive solar features
- Unconventional construction techniques – straw bale, rammed earth, bottles, cans, etc.



# Manual J is not to be used for the following types of buildings

Any type of commercial activity conducted in a space that was designed and built for residential use.

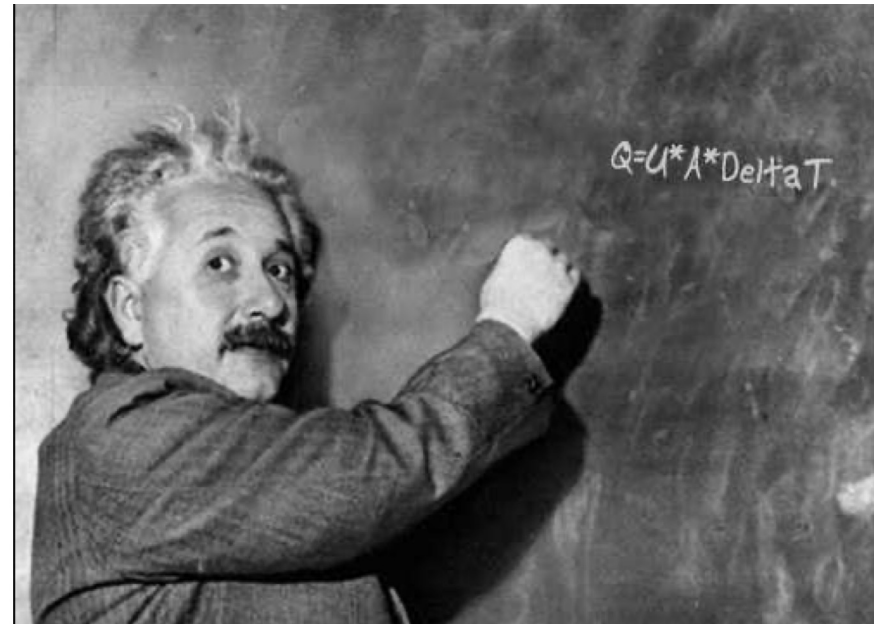
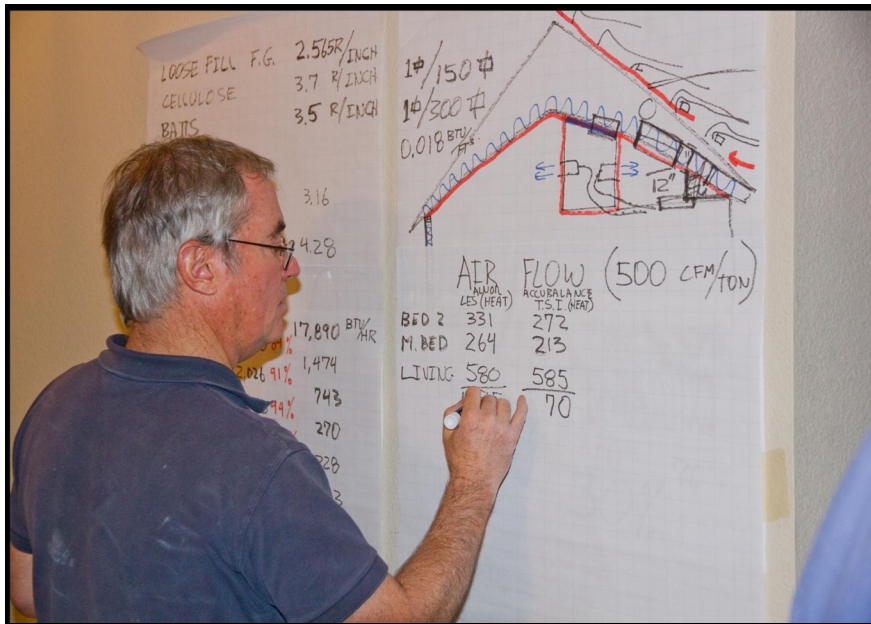
Spaces that contain a swimming pool and / or spa.



# HEAT TRANSFER IS COMPLICATED

The load calculation procedure is a gross simplification of the physics and mathematics necessary to determine the amount of energy needed in a space to provide comfort.

Manual J v2.5 pg 13



# The Site Survey Provides the Input Data

The accuracy of the load estimating procedure is only as good as the input, and the input is only as good as the survey.

If *Manual J* software is not used correctly it will produce an inaccurate and misleading answer, and those that have not studied *Manual J* will not know the difference.

**SOFTWARE IS A POWERFUL AND USEFUL  
TOOL, BUT IT DOES NOT KNOW WHAT THE  
RIGHT INPUTS ARE**



# Consequences of not Making a Detailed and Accurate Load Estimate

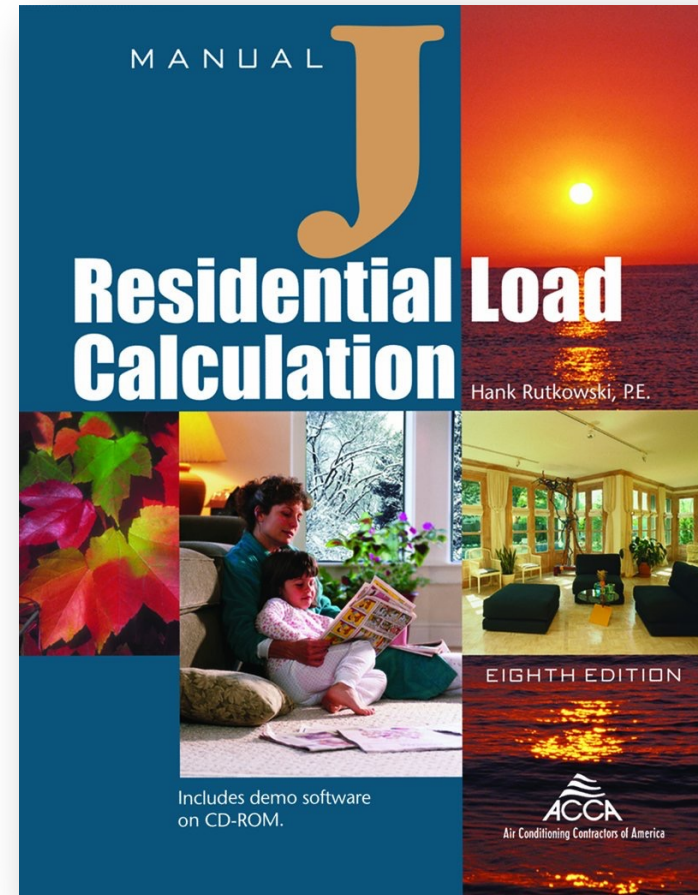
Errors (accidental, or an effort to manipulate output) in the load estimate filter through the entire design and cause the installation to miss the mark.

Manual J v2.5 pg xvi



# AGENDA

- ✓ What a Load Calculation is
- ✓ ACCA Manual J
- ❑ *Your Questions About Load Calculations*



# Questions about Title 24?

3C-REN offers a *free* Code Coach Service



Online:  
[3c-ren.org/code](https://3c-ren.org/code)

Call:  
805.781.1201

Energy Code Coaches are local experts who can help answer your Title 24 Part 6 or Part 11 questions.

They can provide code citations and offer advice for your res or non-res projects.

