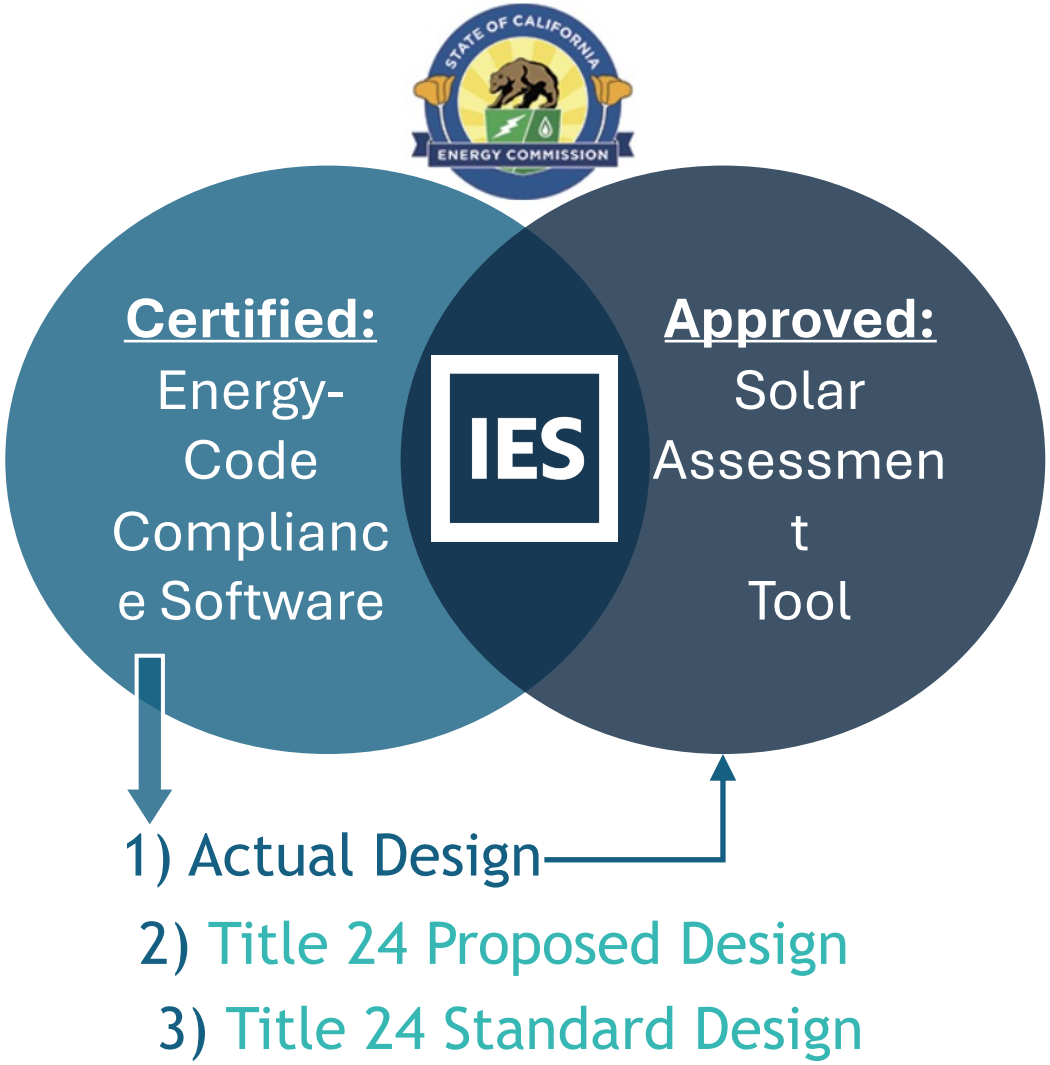
Compliance Software Update

IESVE-2024

Liam Buckley

Liam.Buckley@iesve.com

Compliance Software: IESVE



Compliance Software Update: IESVE-2024

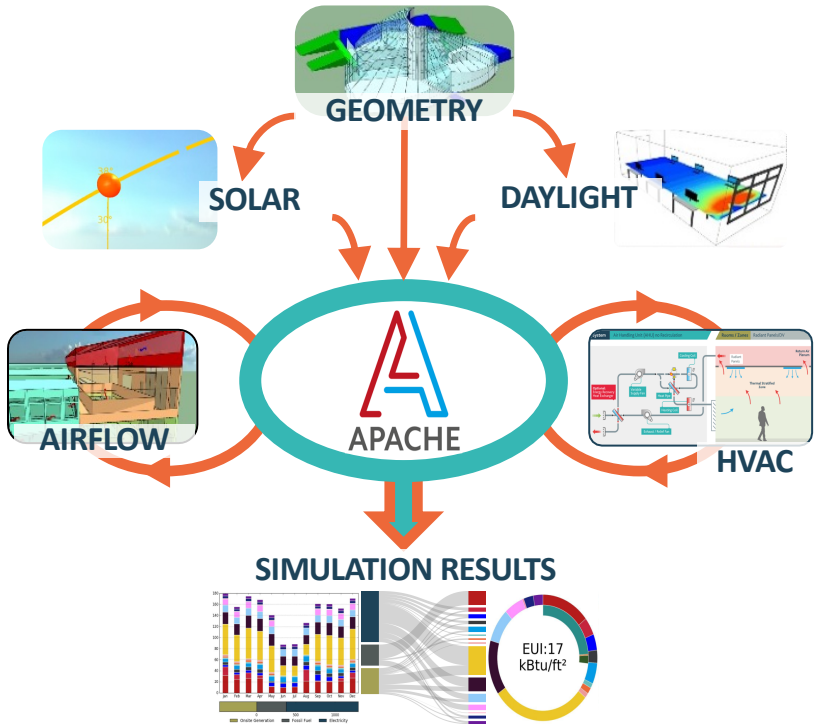
1. Parametric Simulation Feature
2. Heat Pump Enhancement
3. Expanded US Performance Paths: ASHRAE 90.1 - Energy Cost Budget Method
4. California’s Solar Assessment Tools

1) Parametric Simulation Feature

Highlights: Free integrated update, Automated, Data/Speed Enhancements

Input Categories & Permutation Options:

1. **Site / Climate:** Weather, Orientation
2. **Geometry:** %WWR, Shading Scenarios
3. **Renewable Energy:** PV panels, Wind
4. **Envelope:** Assemblies, Air Tightness, Operable Windows
5. **Internal Gains:** Lighting, Daylight Controls
6. **HVAC:** Setpoints, System Types



Outputs: Energy, Cost & Carbon

1) Parametric Simulation Feature - Weather

1) Parametric Simulation Feature - Architectural Shading

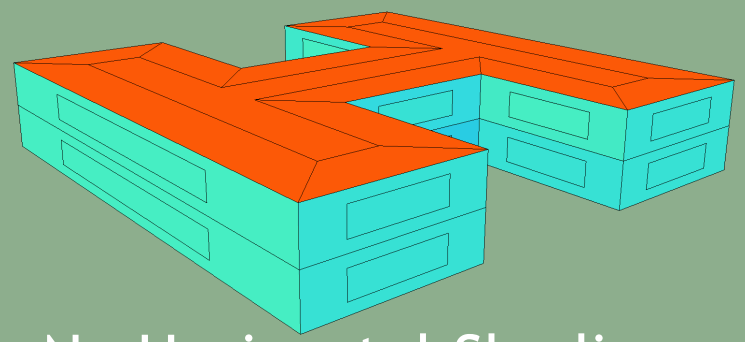
Parametric Simulation - 1-Tab Study*

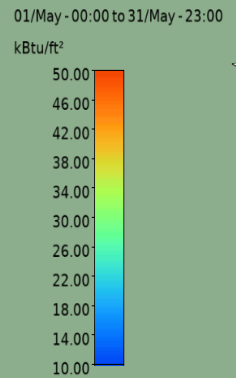
File Tab Actions Help

File
- New Study
- Open Study...
- Save Study
- Save Study As...
- Delete Study

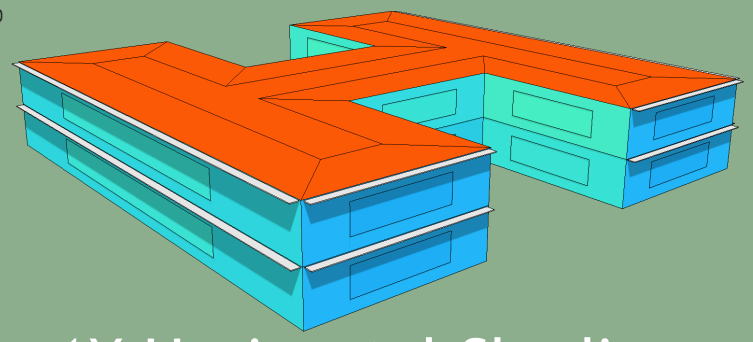
1-Tab Study (6)

Weather File	Shading Scenario	Solar Panel Area (ft²)	External Window Construction	Lighting Max Sensible Gain and Power Consumption (Individual Gain)	ApacheHVAC File (ASP)
New.York.City-La.Guardia-2020.epw	Shading scenario 1	0.000	U=0.20(1.14); SHGC=0.20; VT=0.60	0.600 W/ft²	DOAS - Heat Pumps.asp
New.York.City-La.Guardia-2050.epw	Shading Scenario 2 - 1X Deep	7500.002	U=0.25(1.42); SHGC=0.25; VT=0.60	0.800 W/ft²	DOAS with ERVs - Heat Pumps.asp
New.York.City-La.Guardia-2080.epw	Shading Scenario 3 - 2X Deep	15000.047	U=0.30(1.70); SHGC=0.30; VT=0.60	1.000 W/ft²	VAV - Boiler and Chiller.asp
Add new value...	Add new value...	Add new value...	U=0.35(1.98); SHGC=0.35; VT=0.60	Add new value...	VAV with ERV - Boiler and Chiller.asp
			Add new value...		Add new value...

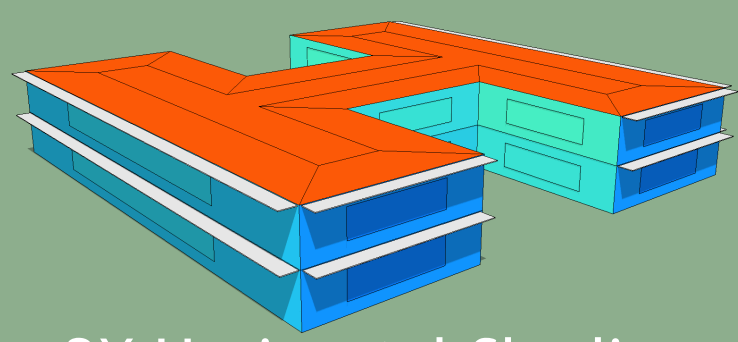




No Horizontal Shading



1X Horizontal Shading



2X Horizontal Shading

1) Parametric Simulation Feature - PV Panel Area

Parametric Simulation - 1-Tab Study*

File Tab Actions Help

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- Save Study
- Save Study As...
- Delete Study

1-Tab Study (6)

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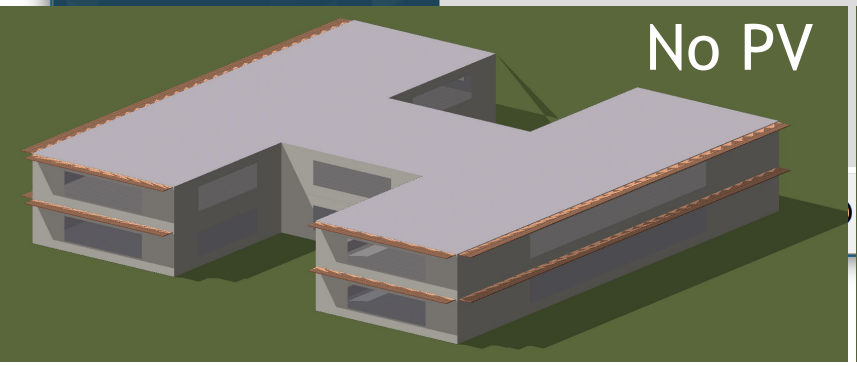
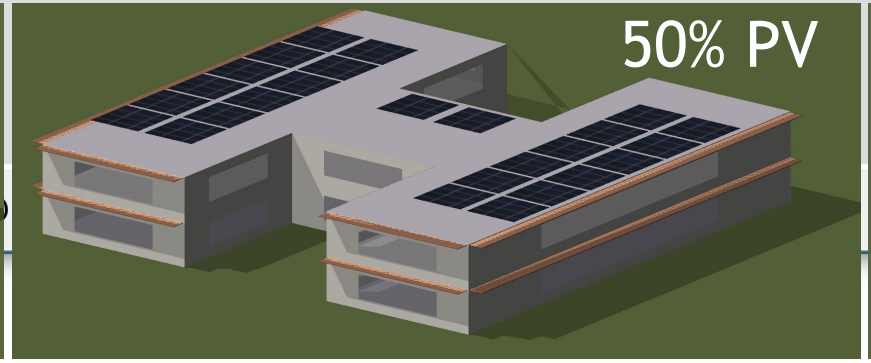
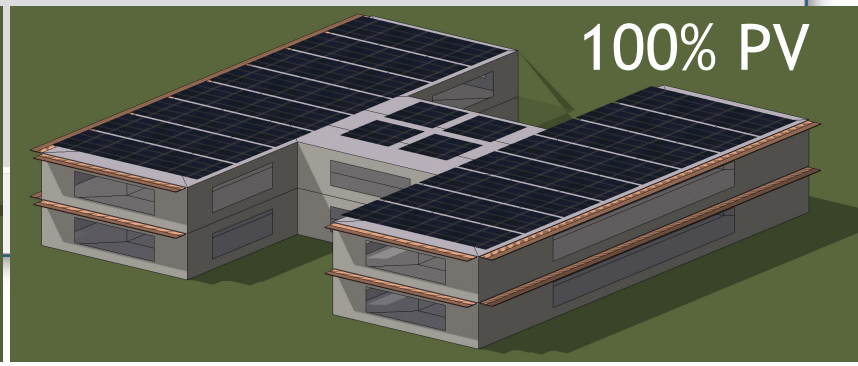
New.York.City-La.Guardia-2020.epw	Shading scenario 1	0.000	U=0.20(1.14); SHGC=0.20; VT=0.60	0.600 W/ft²	DOAS - Heat Pumps.asp
New.York.City-La.Guardia-2050.epw	Shading Scenario 2 - 1X Deep	7500.002	U=0.25(1.42); SHGC=0.25; VT=0.60	0.800 W/ft²	DOAS with ERVs - Heat Pumps.asp
New.York.City-La.Guardia-2080.epw	Shading Scenario 3 - 2X Deep	15000.047	U=0.30(1.70); SHGC=0.30; VT=0.60	1.000 W/ft²	VAV - Boiler and Chiller.asp
Add new value...	Add new value...	Add new value...	U=0.35(1.98); SHGC=0.35; VT=0.60	Add new value...	VAV with ERV - Boiler and Chiller.asp
			Add new value...		Add new value...







1) Parametric Simulation Feature - Envelope

Parametric Simulation - 1-Tab Study*

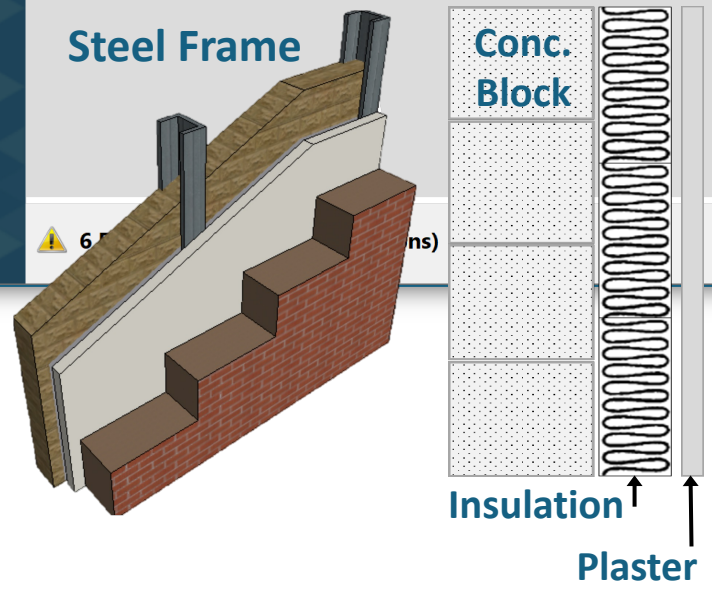
File Tab Actions Help

File
- New Study
- Open Study...
- Save Study
- Save Study As...
- Delete Study

Actions
- Apply run # to model...
- Import...
- Export...
- Configure tabs and columns...

1-Tab Study (6)

Weather File	Shading Scenario	Solar Panel Area (ft²)	External Window Construction	Lighting Max Sensible Gain and Power Consumption (Individual Gain)	ApacheHVAC File (ASP)
New.York.City-La.Guardia-2020.epw	Shading scenario 1	0.000	U=0.20(1.14); SHGC=0.20; VT=0.60	0.600 W/ft²	DOAS - Heat Pumps.asp
New.York.City-La.Guardia-2050.epw	Shading Scenario 2 - 1X Deep	7500.002	U=0.25(1.42); SHGC=0.25; VT=0.60	0.800 W/ft²	DOAS with ERVs - Heat Pumps.asp
New.York.City-La.Guardia-2080.epw	Shading Scenario 3 - 2X Deep	15000.047	U=0.30(1.70); SHGC=0.30; VT=0.60	1.000 W/ft²	VAV - Boiler and Chiller.asp
Add new value...	*Add new value...*	*Add new value...*	U=0.35(1.98); SHGC=0.35; VT=0.60	*Add new value...*	VAV with ERV - Boiler and Chiller.asp
			Add new value...		*Add new value...*



MacroFlo Opening Types

MacroFlo Opening Types

XTRN0000	01- No Natural Ventilation
XTRN0001	03 - Passivent Airscoop
XTRN0002	02 - Operable Windows

Reference ID: XTRN0002

Description: 02 - Operable Windows

Exposure Type: 05. 1:1 semi-exposed wall

Opening Category: Window - top hung

1) Parametric Simulation Feature - Lighting/Daylight

Parametric Simulation - 1-Tab Study*

File Tab Actions Help

File

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- Open Study...
- Save Study
- Save Study As...
- Delete Study

Actions

- Apply run # to model...
- Import...
- Export...
- Configure tabs and columns...

1-Tab Study (6)

Weather File	Shading Scenario	Solar Panel Area (ft²)	External Window Construction	Lighting Max Sensible Gain and Power Consumption (Individual Gain)	ApacheHVAC File (ASP)
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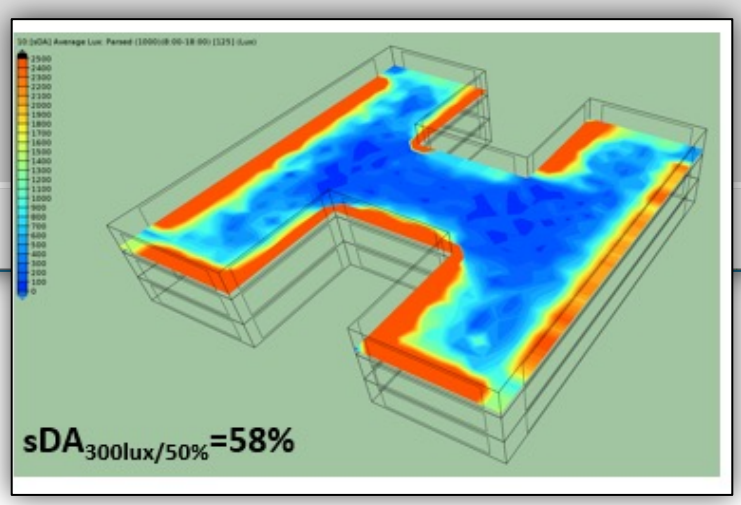
New.York.City-La.Guardia-2080.epw	Shading Scenario 3 - 2X Deep	15000.047	U=0.30(1.70); SHGC=0.30; VT=0.60	1.000 W/ft²	VAV - Boiler and Chiller.asp
Add new value...	*Add new value...*	*Add new value...*	U=0.35(1.98); SHGC=0.35; VT=0.60	*Add new value...*	VAV with ERV - Boiler and Chiller.asp
			Add new value...		*Add new value...*

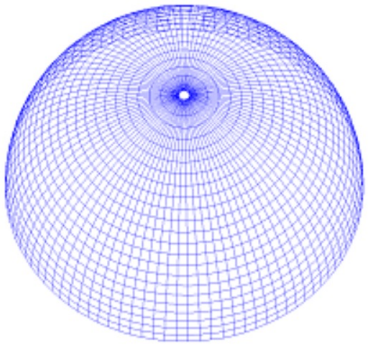
6 Parameters (1296 Permutations)



Sky Resolution

The Sky Resolution is the number of patches the sky hemisphere is divided into for the calculation of the Daylight Coefficients used in the Dynamic Daylighting Simulations.

- 145 Patches
- 577 Patches
- 2305 Patches



1) Parametric Simulation Feature - HVAC

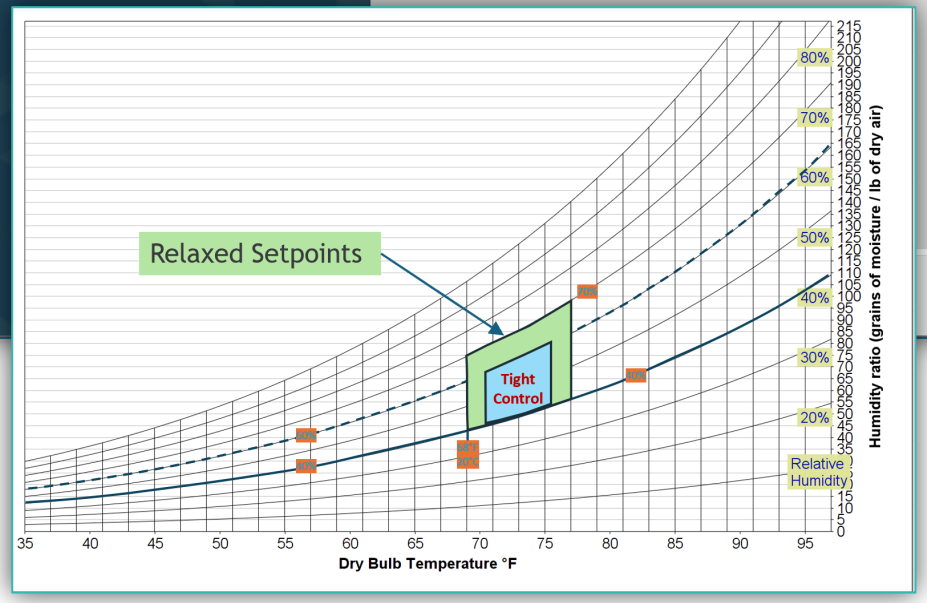
Parametric Simulation - 1-Tab Study*

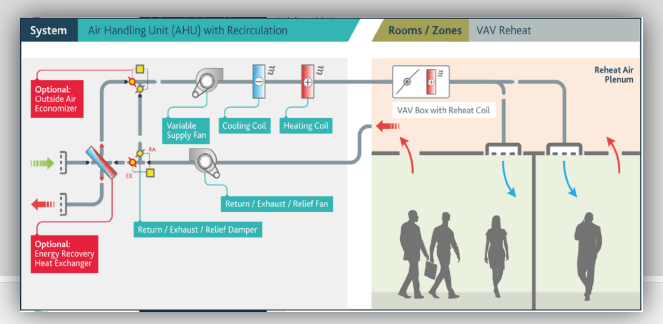
File Tab Actions Help

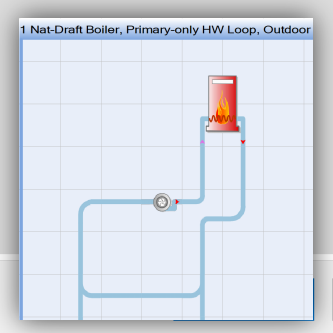
File
- New Study
- Open Study...
- Save Study
- Save Study As...
- Delete Study

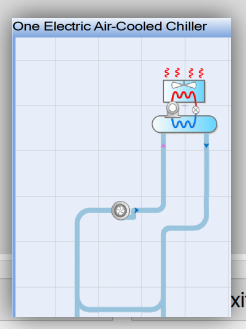
1-Tab Study (6)

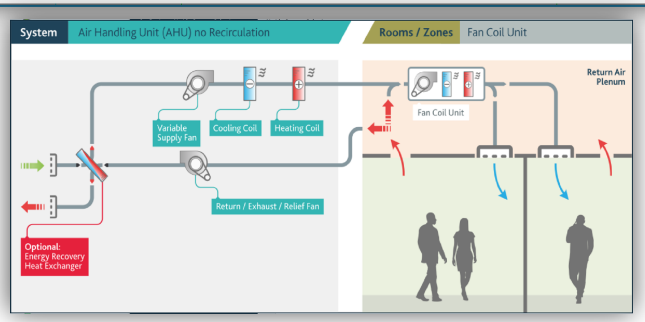
Weather File	Shading Scenario	Solar Panel Area (ft²)	External Window Construction	Lighting Max Sensible Gain and Power Consumption (Individual Gain)	ApacheHVAC File (ASP)
New.York.City-La.Guardia-2020.epw	Shading scenario 1	0.000	U=0.20(1.14); SHGC=0.20; VT=0.60	0.600 W/ft²	DOAS - Heat Pumps.asp
New.York.City-La.Guardia-2050.epw	Shading Scenario 2 - 1X Deep	7500.002	U=0.25(1.42); SHGC=0.25; VT=0.60	0.800 W/ft²	DOAS with ERVs - Heat Pumps.asp
New.York.City-La.Guardia-2080.epw	Shading Scenario 3 - 2X Deep	15000.047	U=0.30(1.70); SHGC=0.30; VT=0.60	1.000 W/ft²	VAV - Boiler and Chiller.asp
Add new value...	Add new value...	Add new value...	U=0.35(1.98); SHGC=0.35; VT=0.60	Add new value...	VAV with ERV - Boiler and Chiller.asp
			Add new value...		Add new value...

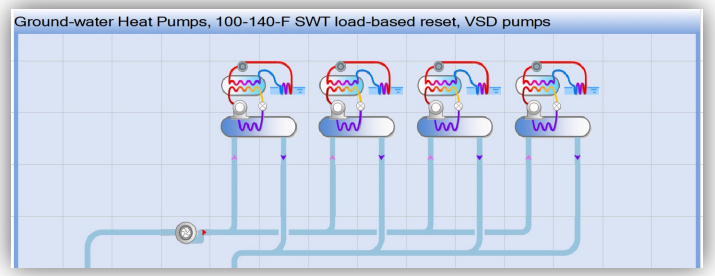




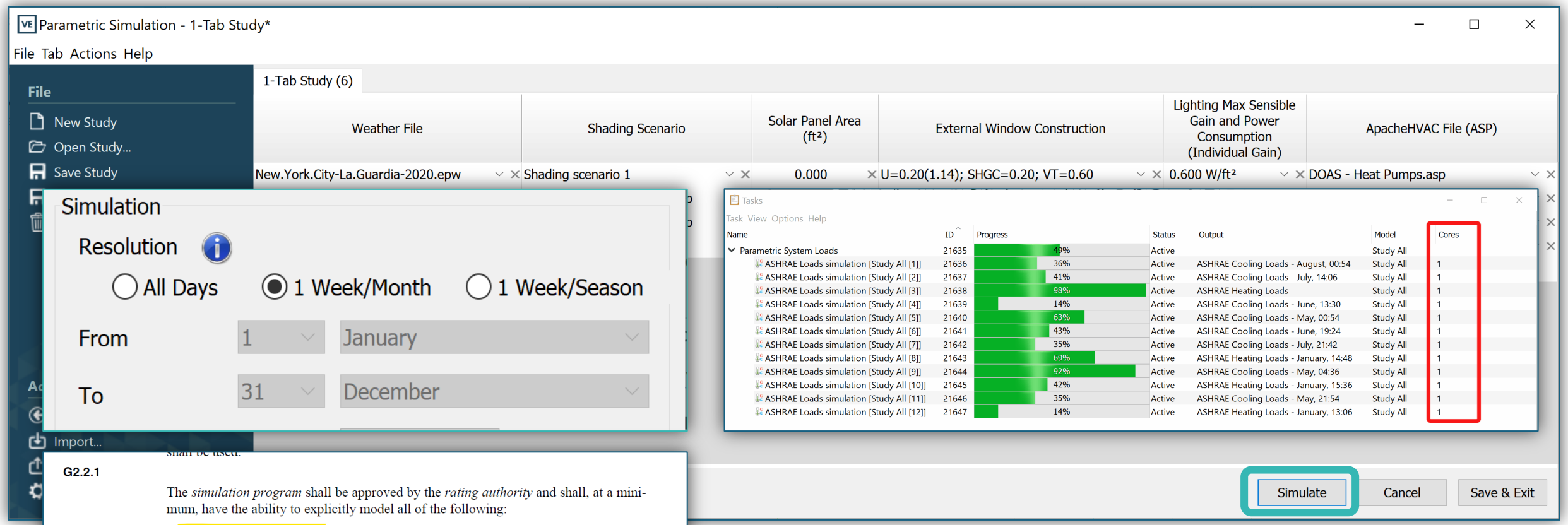






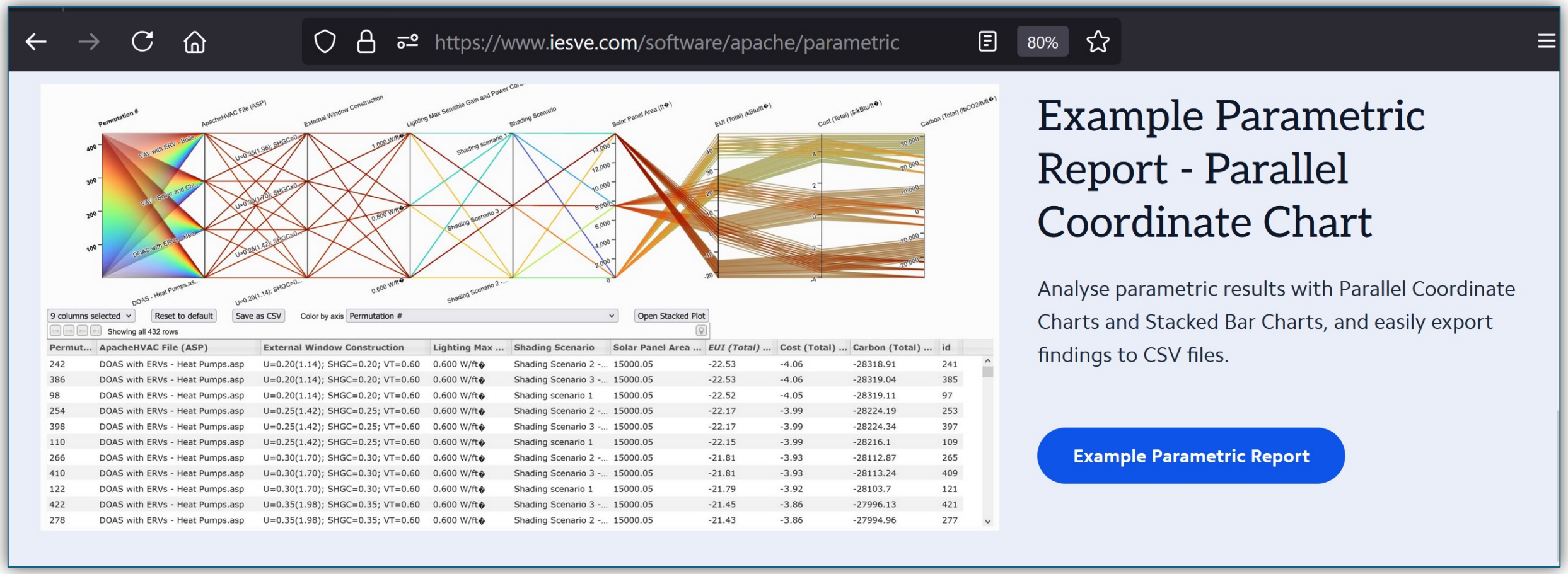


1) Parametric Simulation Feature - ‘Simulate’ = (4-13)*Faster



1) Parametric Simulation Feature - Output Reports

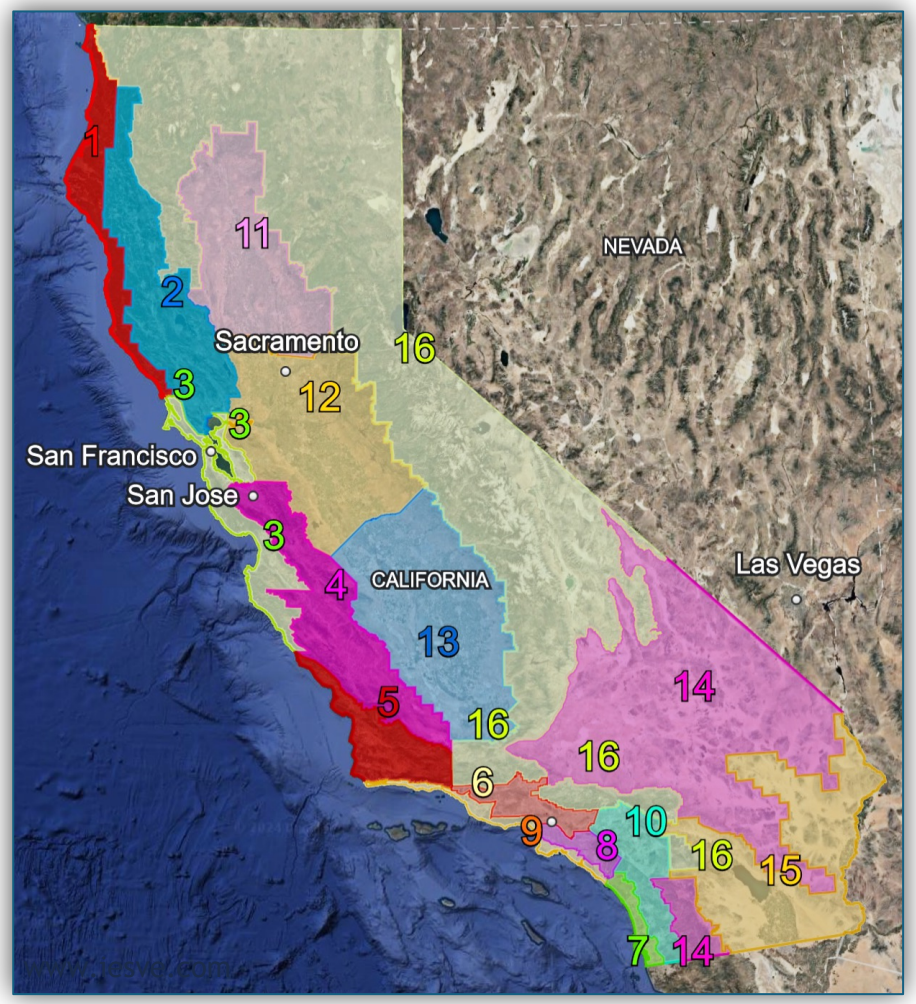
- CSV energy end-use data, Stacked Bar Chart and Parallel Coordinate Chart (Example for you: www.iesve.com/software/apache/parametric)

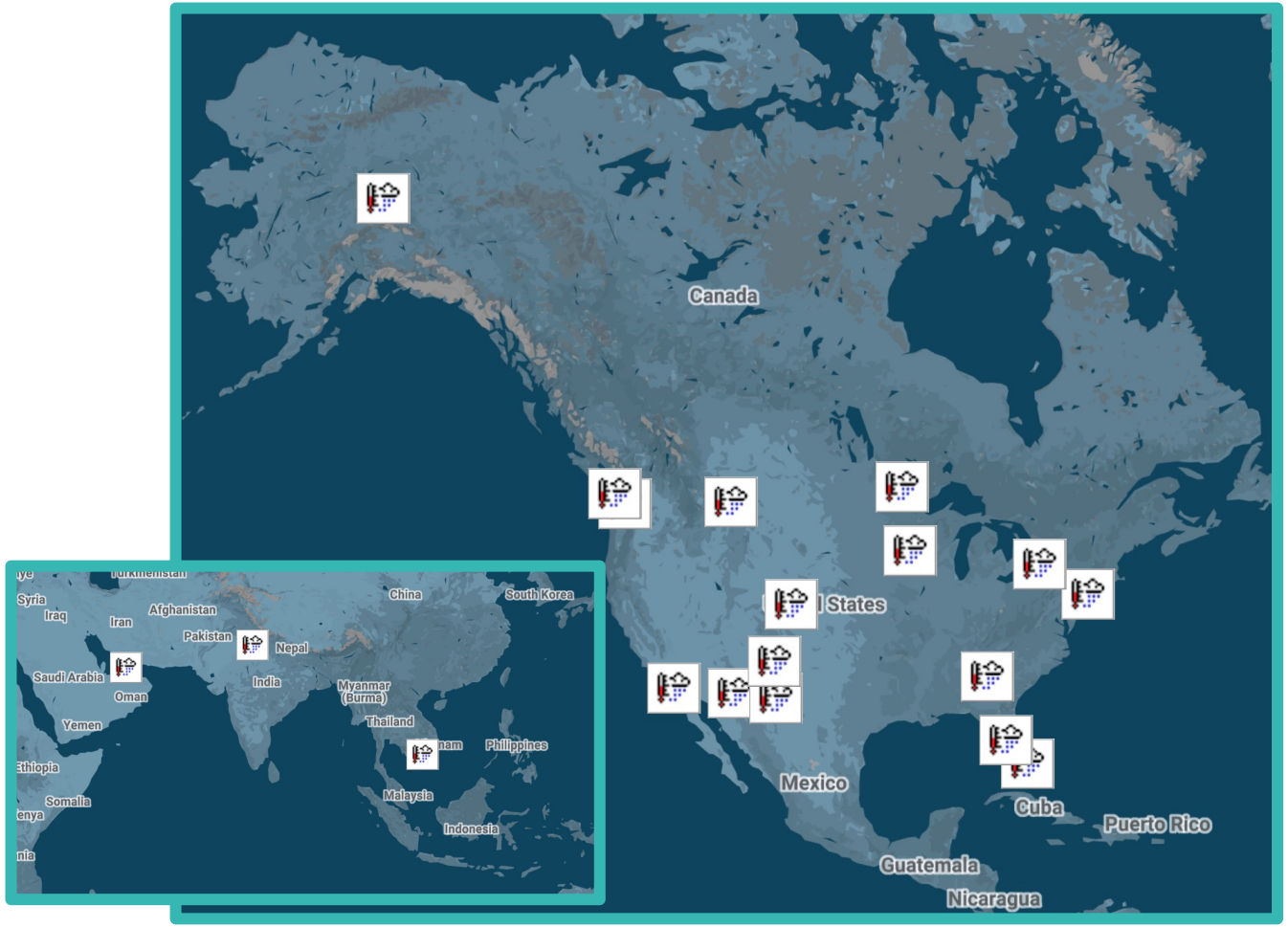


Permut...	ApacheHVAC File (ASP)	External Window Construction	Lighting Max ...	Shading Scenario	Solar Panel Area ...	EUI (Total) ...	Cost (Total) ...	Carbon (Total) ...	id
242	DOAS with ERVs - Heat Pumps.asp	U=0.20(1.14); SHGC=0.20; VT=0.60	0.600 W/ft²	Shading Scenario 2 -...	15000.05	-22.53	-4.06	-28318.91	241
386	DOAS with ERVs - Heat Pumps.asp	U=0.20(1.14); SHGC=0.20; VT=0.60	0.600 W/ft²	Shading Scenario 3 -...	15000.05	-22.53	-4.06	-28319.04	385
98	DOAS with ERVs - Heat Pumps.asp	U=0.20(1.14); SHGC=0.20; VT=0.60	0.600 W/ft²	Shading scenario 1	15000.05	-22.52	-4.05	-28319.11	97
254	DOAS with ERVs - Heat Pumps.asp	U=0.25(1.42); SHGC=0.25; VT=0.60	0.600 W/ft²	Shading Scenario 2 -...	15000.05	-22.17	-3.99	-28224.19	253
398	DOAS with ERVs - Heat Pumps.asp	U=0.25(1.42); SHGC=0.25; VT=0.60	0.600 W/ft²	Shading Scenario 3 -...	15000.05	-22.17	-3.99	-28224.34	397
110	DOAS with ERVs - Heat Pumps.asp	U=0.25(1.42); SHGC=0.25; VT=0.60	0.600 W/ft²	Shading scenario 1	15000.05	-22.15	-3.99	-28216.1	109
266	DOAS with ERVs - Heat Pumps.asp	U=0.30(1.70); SHGC=0.30; VT=0.60	0.600 W/ft²	Shading Scenario 2 -...	15000.05	-21.81	-3.93	-28112.87	265
410	DOAS with ERVs - Heat Pumps.asp	U=0.30(1.70); SHGC=0.30; VT=0.60	0.600 W/ft²	Shading Scenario 3 -...	15000.05	-21.81	-3.93	-28113.24	409
122	DOAS with ERVs - Heat Pumps.asp	U=0.30(1.70); SHGC=0.30; VT=0.60	0.600 W/ft²	Shading scenario 1	15000.05	-21.79	-3.92	-28103.7	121
422	DOAS with ERVs - Heat Pumps.asp	U=0.35(1.98); SHGC=0.35; VT=0.60	0.600 W/ft²	Shading Scenario 3 -...	15000.05	-21.45	-3.86	-27996.13	421
278	DOAS with ERVs - Heat Pumps.asp	U=0.35(1.98); SHGC=0.35; VT=0.60	0.600 W/ft²	Shading Scenario 2 -...	15000.05	-21.43	-3.86	-27994.96	277

1) Parametric Simulation Feature - Future Feature

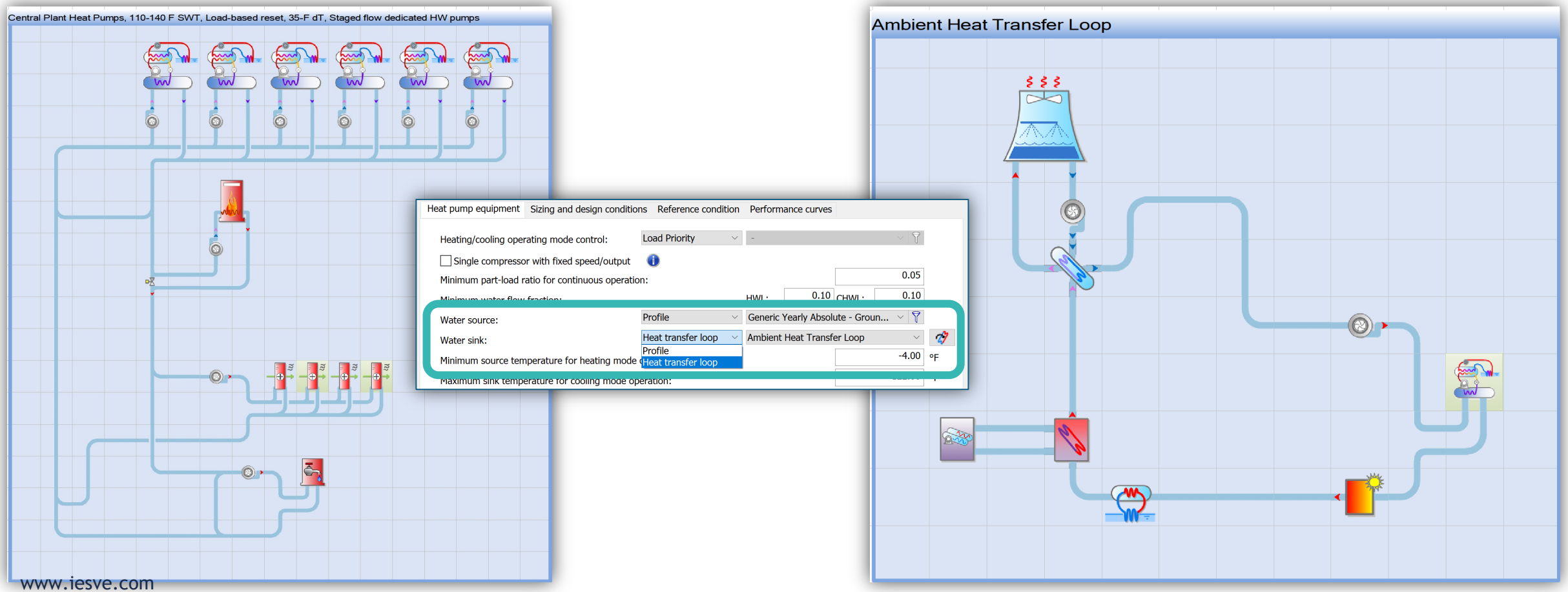
– *Locations*, for prototypical analysis by Climate Zones





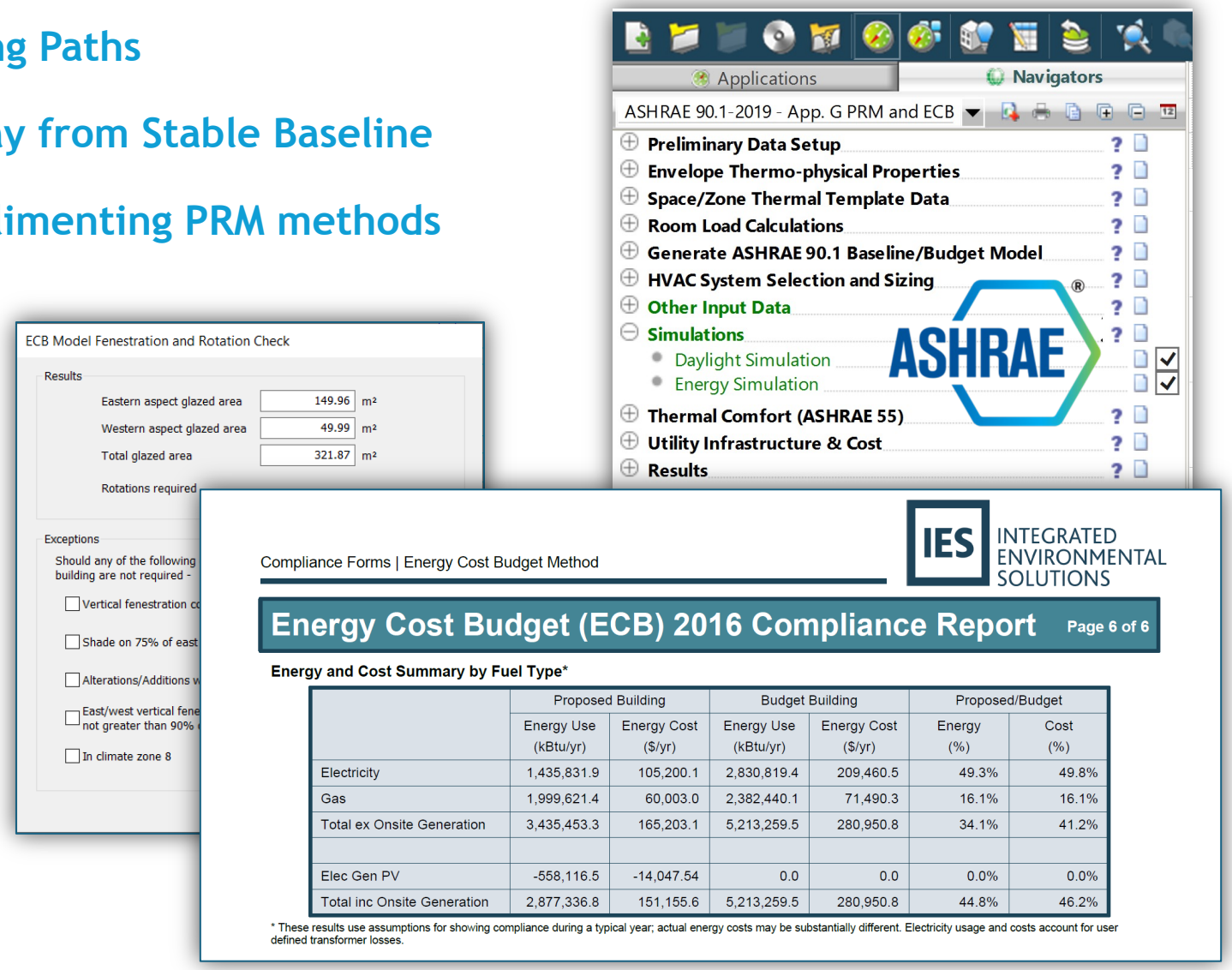
2) Heat Pump Enhancements: Sink/Source

- Individual WW Heat Pump access to ambient Heat Transfer Loops, twice, as a Sink and/or Source.
- HWL (WWHPs) to gain access to heat rejected by WAHPs or WS-VRFs; or other heating equipment.



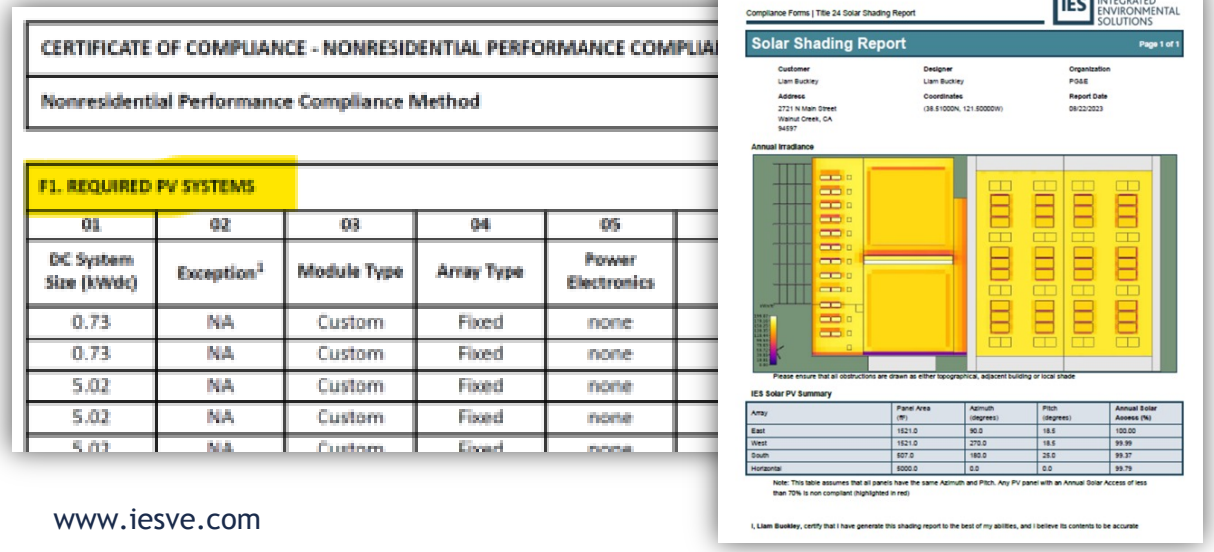
3) Expanded US Performance Paths: ASHRAE's ECB Method

- California *Adjacent* Compliance Modeling Paths
- Practitioner industry in US pivoting away from Stable Baseline
- ASHRAE 90.1 *ECB* (2016 & 2019), complimenting PRM methods
- 90.1 ECB Automation:
  - Workflow Navigator
  - Libraries, Templates, Systems
  - Budget Building Creation
  - Compliance Reports
- Approved Florida Building Commission
  - Oct 15th Business Meeting (URL)



4) Solar Assessment Tools

- Discussion on 2028 shading software changes (2028 JA11), or partially sooner
- Discussion, with feedback from:
  - Industry
  - Approved Software Vendors
  - *Could 'X' be modeled?*



CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIA

Nonresidential Performance Compliance Method

F1. REQUIRED PV SYSTEMS

01	02	03	04	05
DC System Size (kWdc)	Exception[1]	Module Type	Array Type	Power Electronics
0.73	NA	Custom	Fixed	none
0.73	NA	Custom	Fixed	none
5.02	NA	Custom	Fixed	none
5.02	NA	Custom	Fixed	none
5.03	NA	Custom	Fixed	none

Compliance Forms | Title 24 Solar Shading Report

IES INTEGRATED ENVIRONMENTAL SOLUTIONS

Solar Shading Report

Page 1 of 1

Customer	Designer	Organization
Liam Buckley	Liam Buckley	PG&E
Address	Coordinates	Report Date
2721 N Main Street Walnut Creek, CA 94597	(38.51000N, 121.50000W)	09/22/2023

Annual Irradiance

Please ensure that all obstructions are drawn as either topographical, adjacent building or local shade

IES Solar PV Summary

Array	Panel Area (ft²)	Azimuth (degrees)	Pitch (degrees)	Annual Solar Access (%)
East	1521.0	90.0	18.5	100.00
West	1521.0	270.0	18.5	99.99
South	507.0	180.0	26.0	99.37
Horizontal	5000.0	0.0	0.0	99.79

Note: This table assumes that all panels have the same Azimuth and Pitch. Any PV panel with an Annual Solar Access of less than 70% is non compliant (highlighted in red)

I, Liam Buckley, certify that I have generate this shading report to the best of my abilities, and I believe its contents to be accurate

CA.GOV Share:

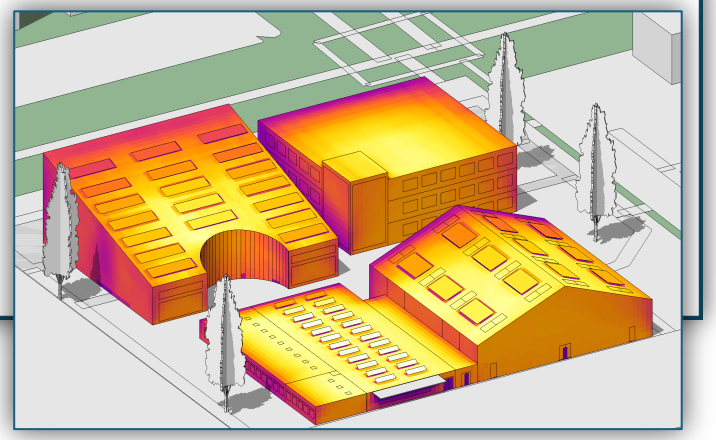
STATE OF CALIFORNIA ENERGY COMMISSION

CALIFORNIA ENERGY COMMISSION

Approved Solar Assessment Tools

The following solar assessment tool has been approved by CEC for use as specified in JA11.4(a)

- Aurora Solar Inc. - Website
  - Aurora Solar Inc. - Shade Report Guide (Ultimate Guide)
- Helioscope - Website
- IESVE Software - Website
- OpenSolar - Website
- Scanifly - Website
- Solar Pathfinder - Website
- Solargraf - Website
- Solmetric Suneye - Website
- Sunrun Lightmile - Website



Thank you

Liam.Buckley@iesve.com