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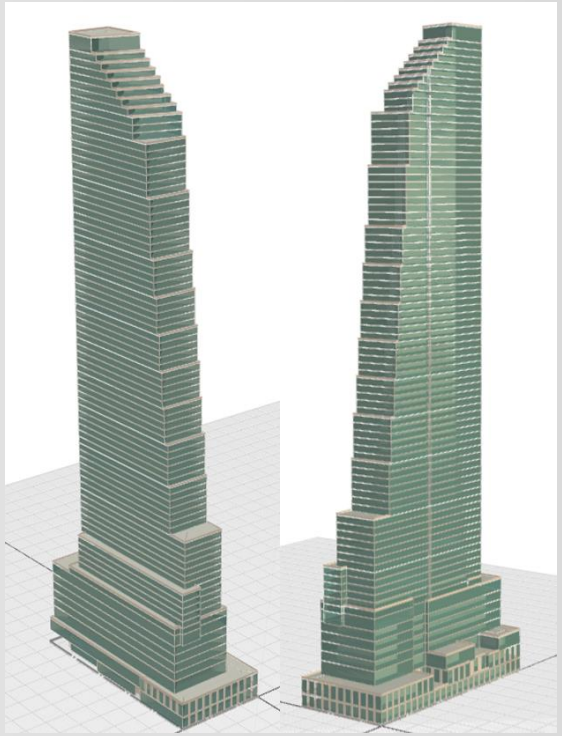
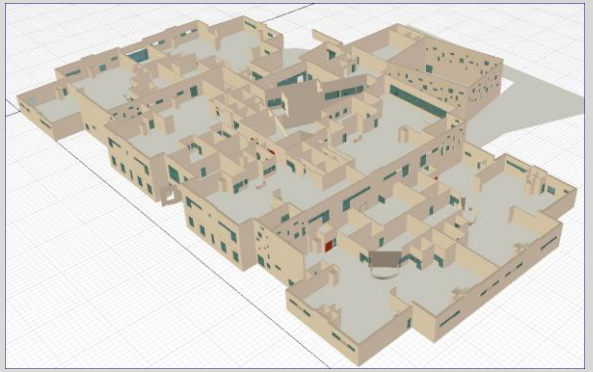
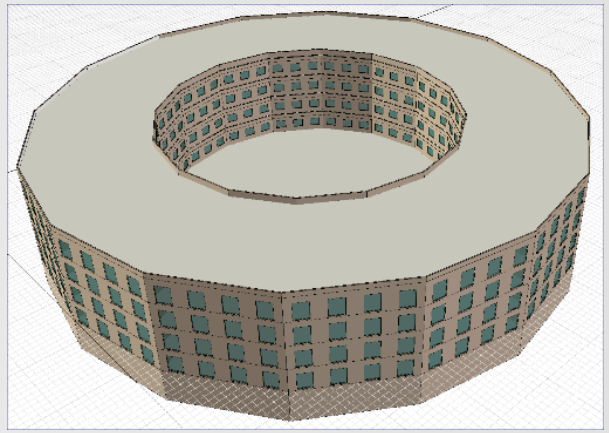
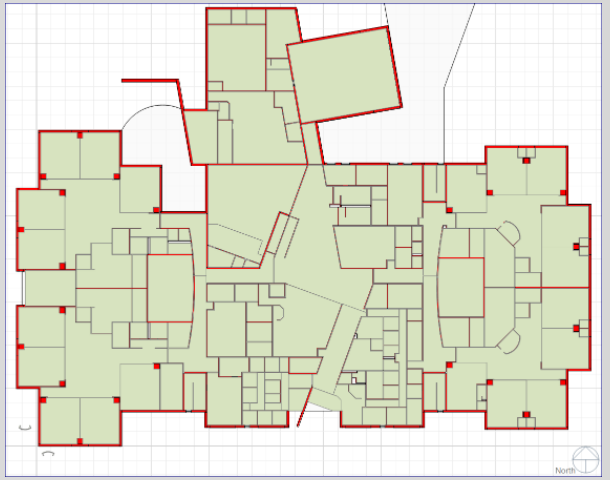
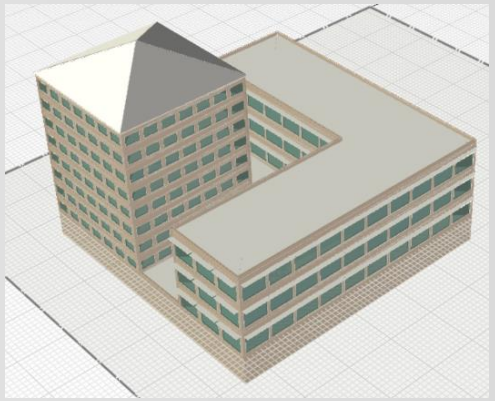
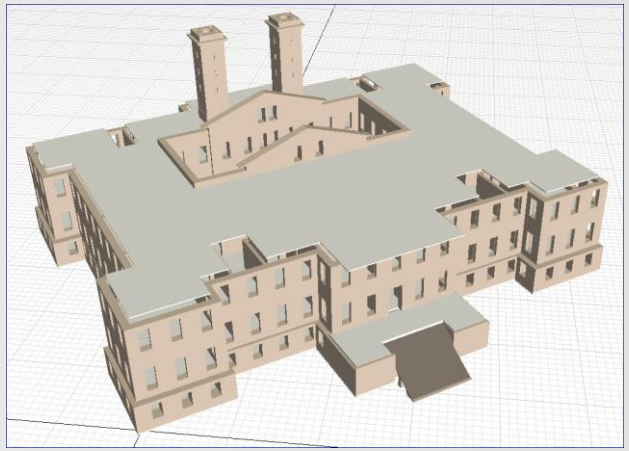
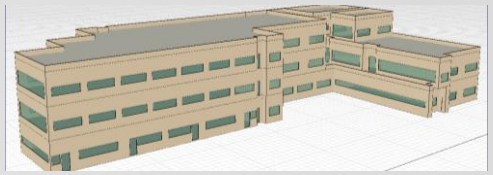
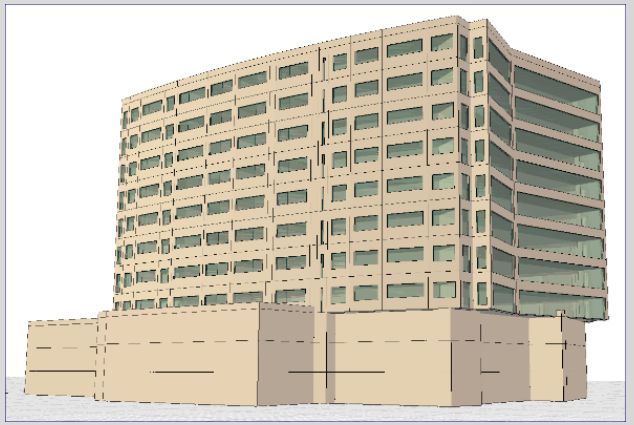
THE BUILDING MODELING EXPERTS

Simergy 101

Building your first Simergy model

Tobias Maile & Richard See

Agenda

- Simergy Professional installation
- How this training works
- Introduction to basic Simergy workspaces and concepts
- Design questions?
- Lesson 1a & 1b: Using the **Building and System Model Creator™**
- Lesson 2:Change window fenestration with a Measure
- Lesson 3: Define Heat Pump System
- Lesson 4: Define ASHRAE-7 system
- Q&A

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How this training works!

1. Step by step instructions to create this model
   - in this video
   - in the related script
2. Please ask questions
   - via email: Support@D-Alchemy.com
   - at our periodic **Coaching Sessions** (http://d-alchemy.com/events)

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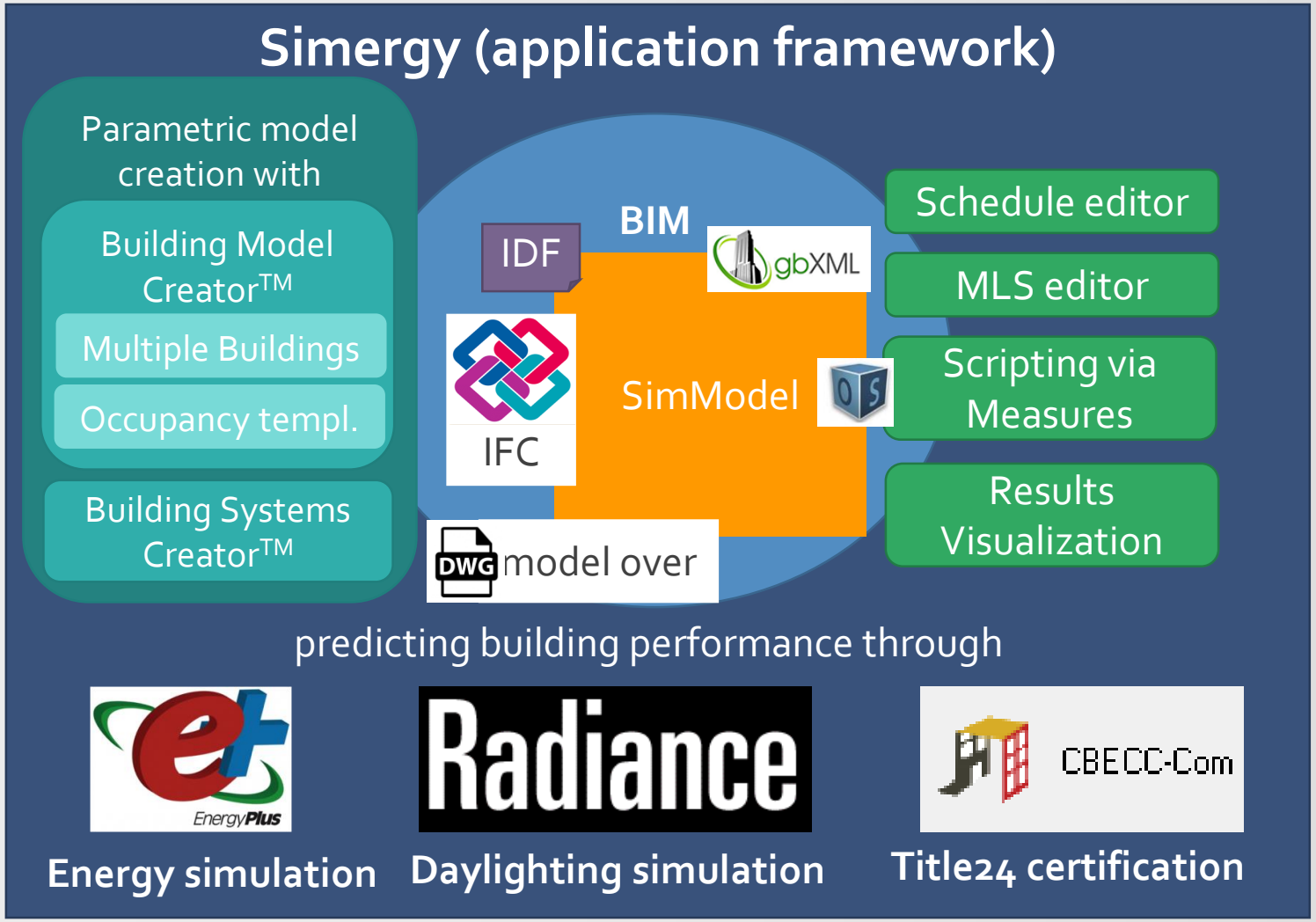
What is Simergy™



Simergy is a Building Information Model (BIM) based application framework for predicting the performance of buildings before they are built or retrofit.

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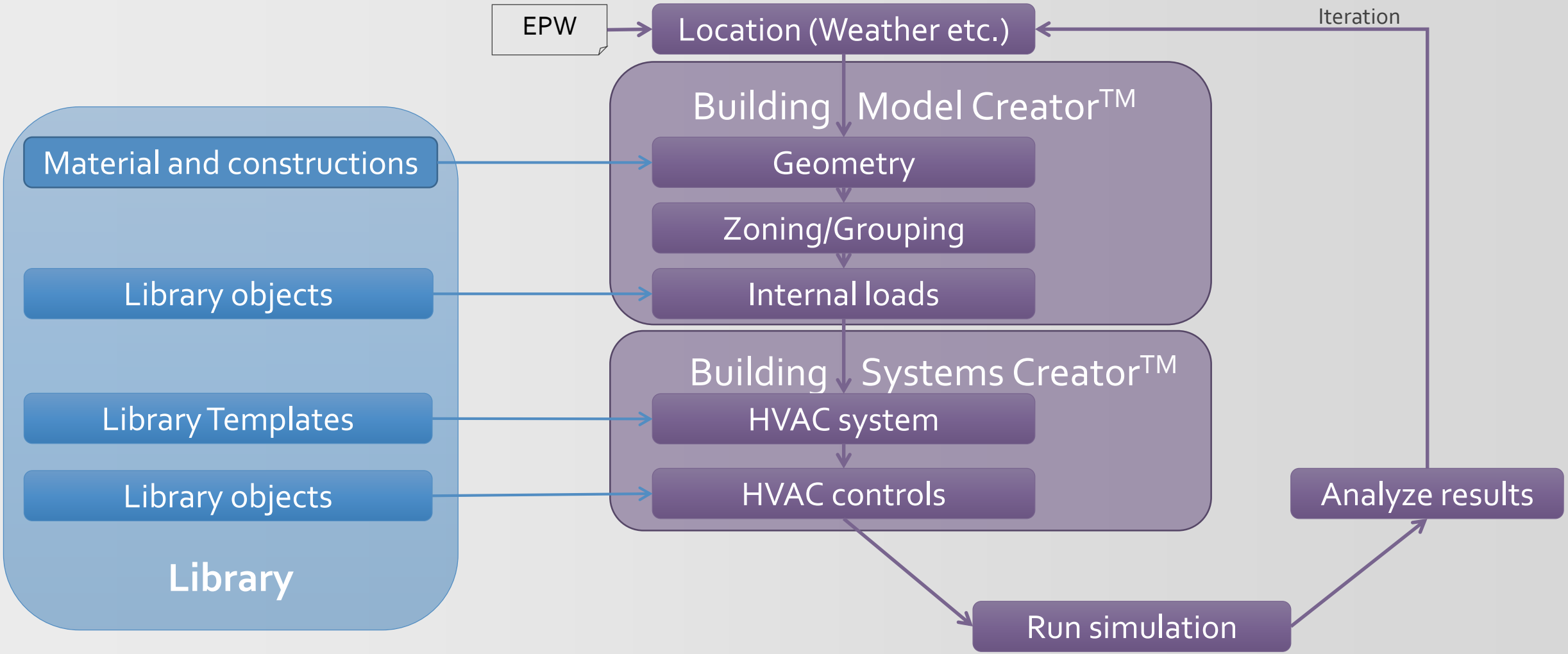
Generic model generation workflow



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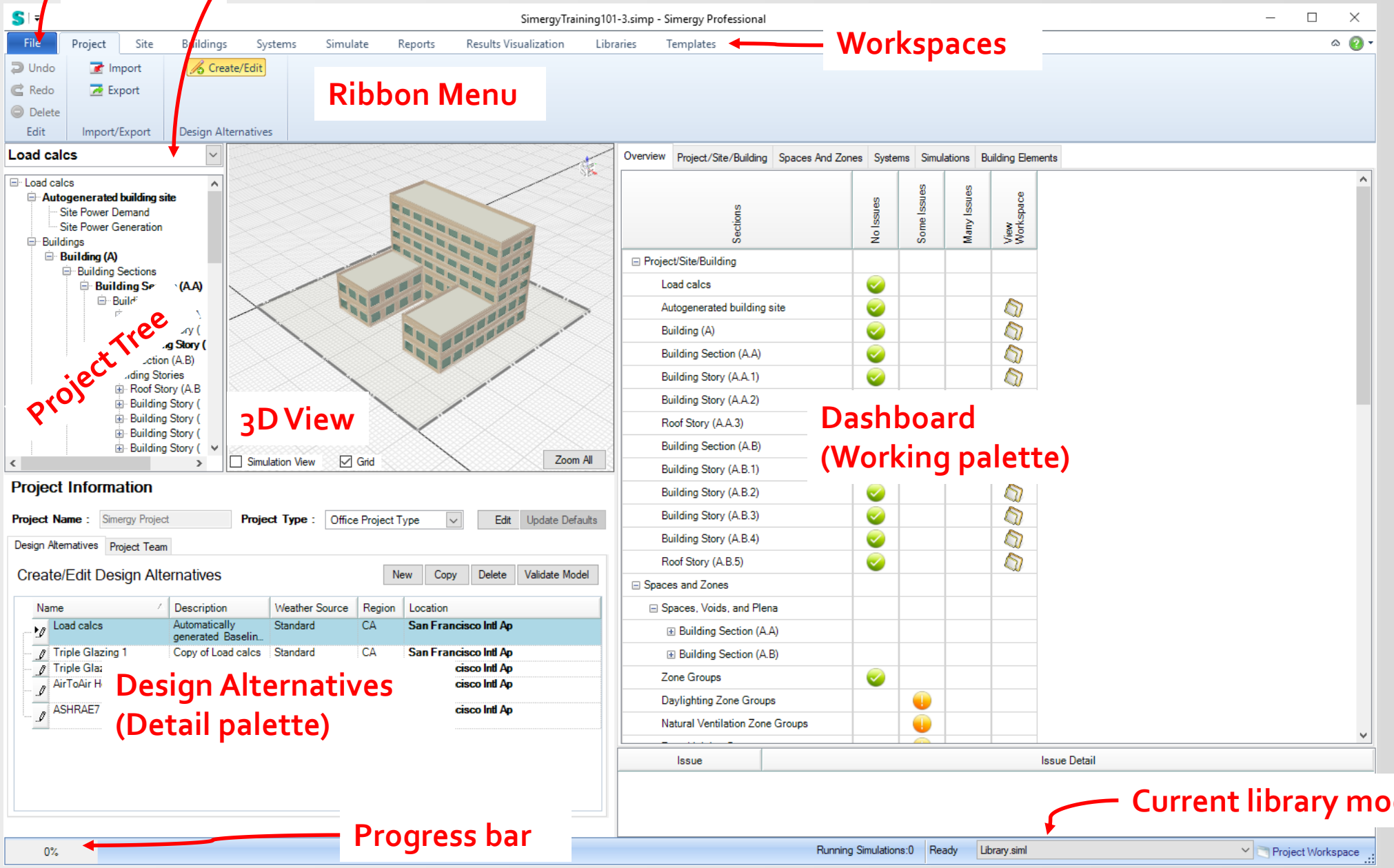
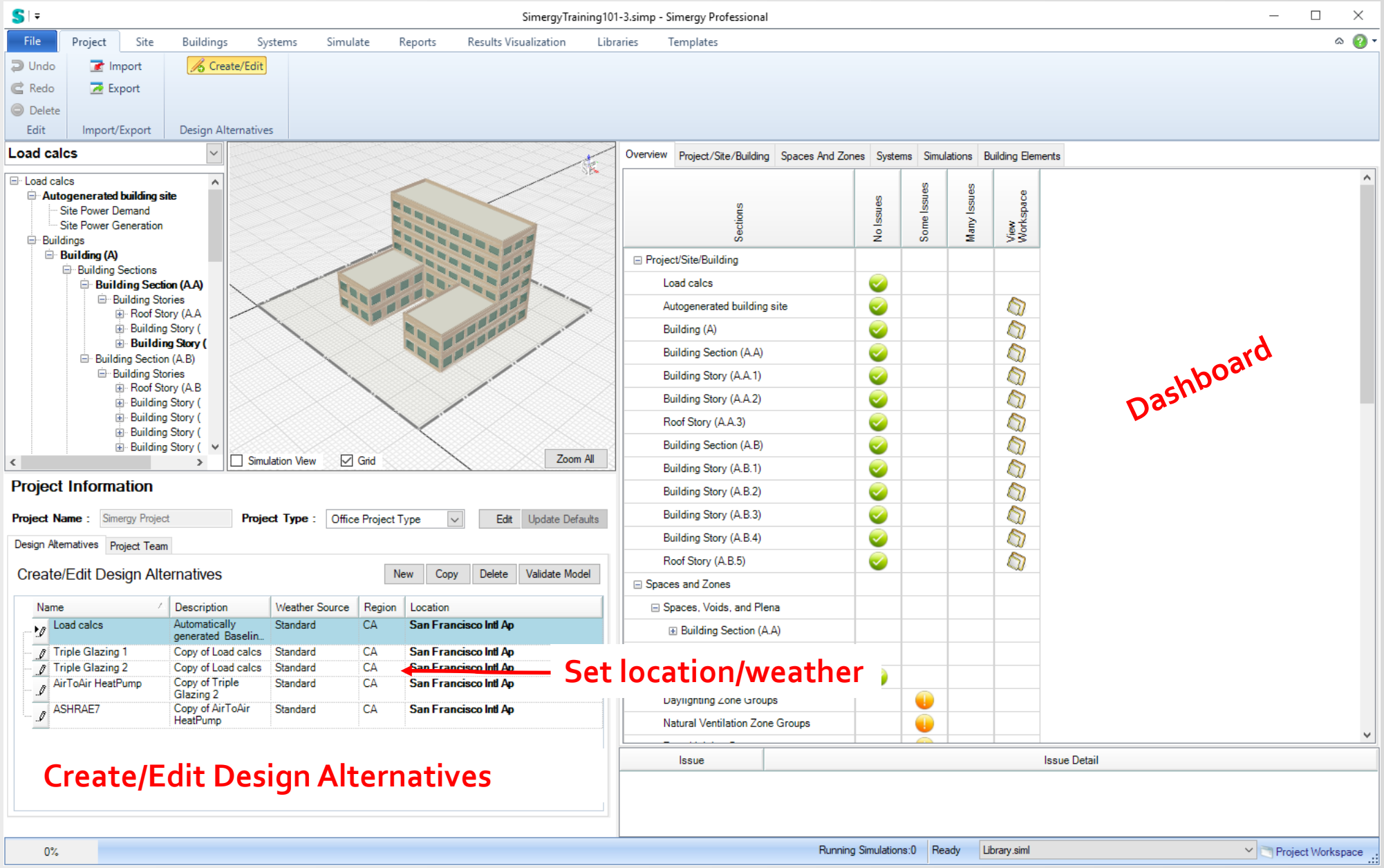
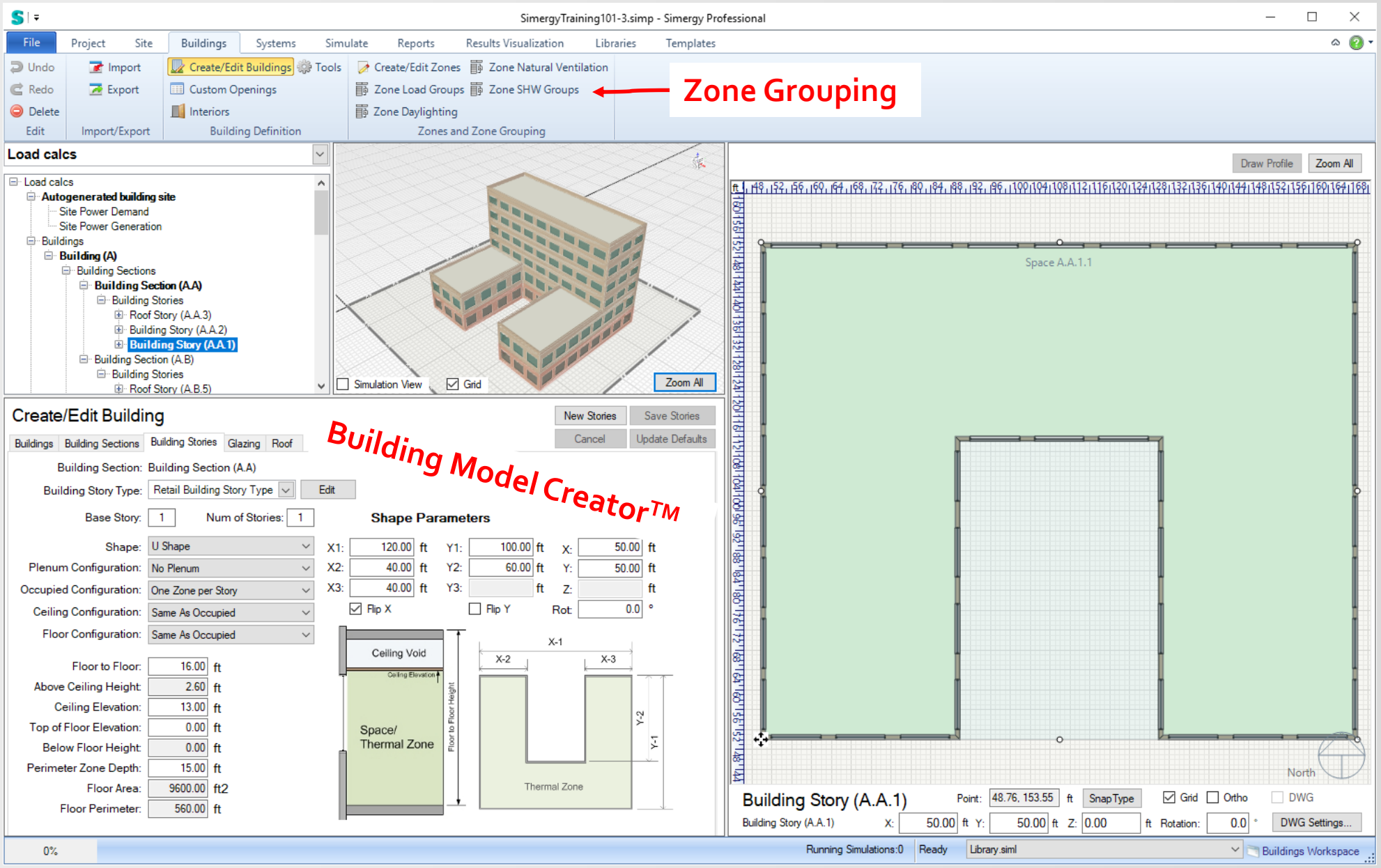
Basic Simergy Layout



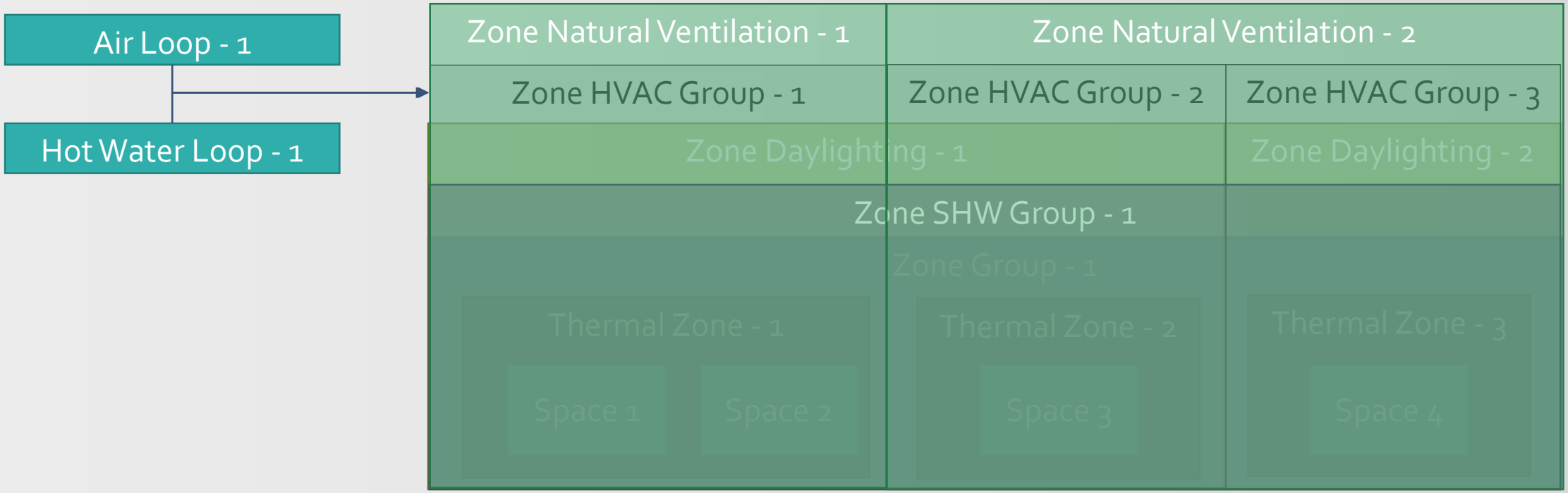
Project workspace



Building workspace



Grouping



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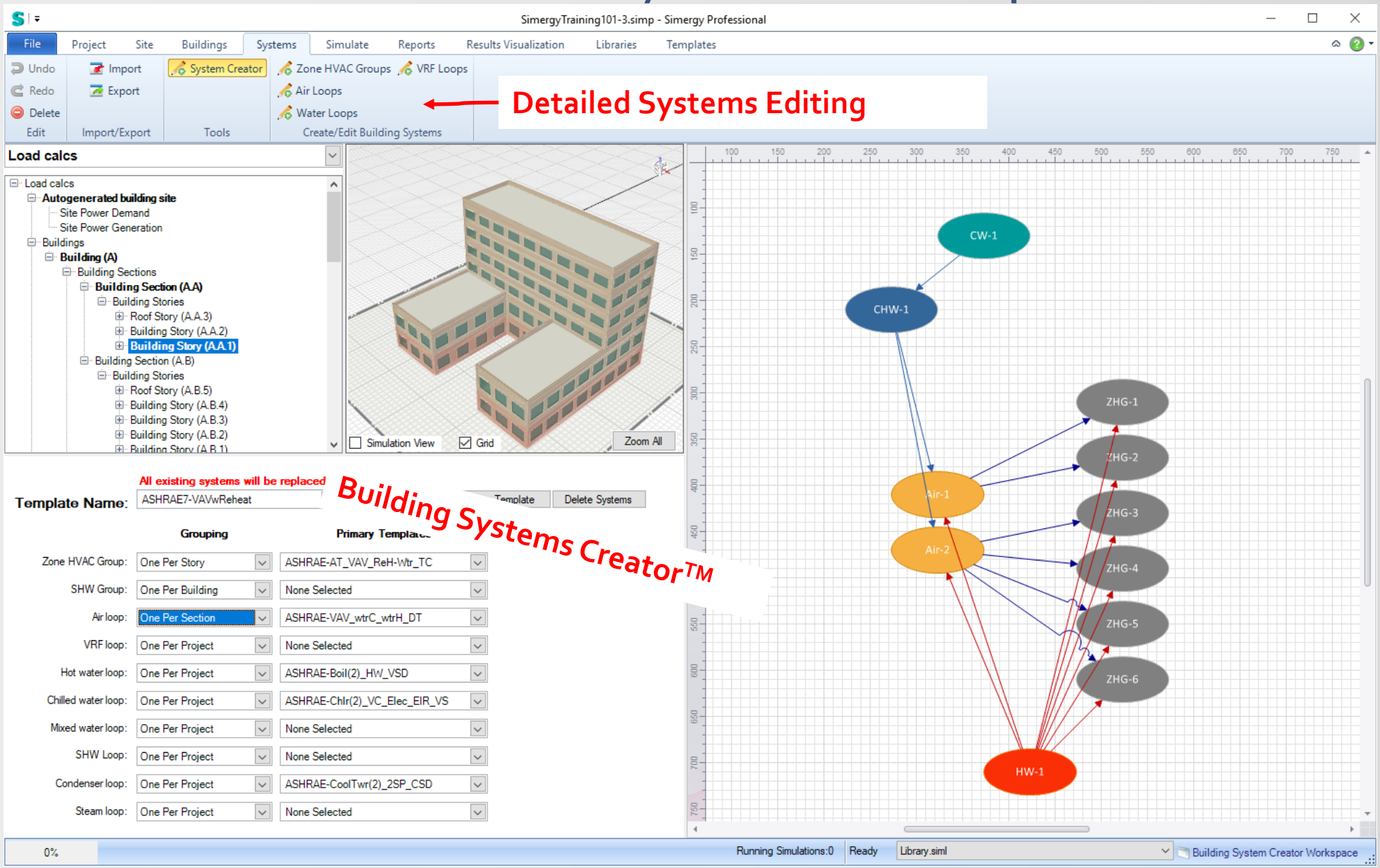
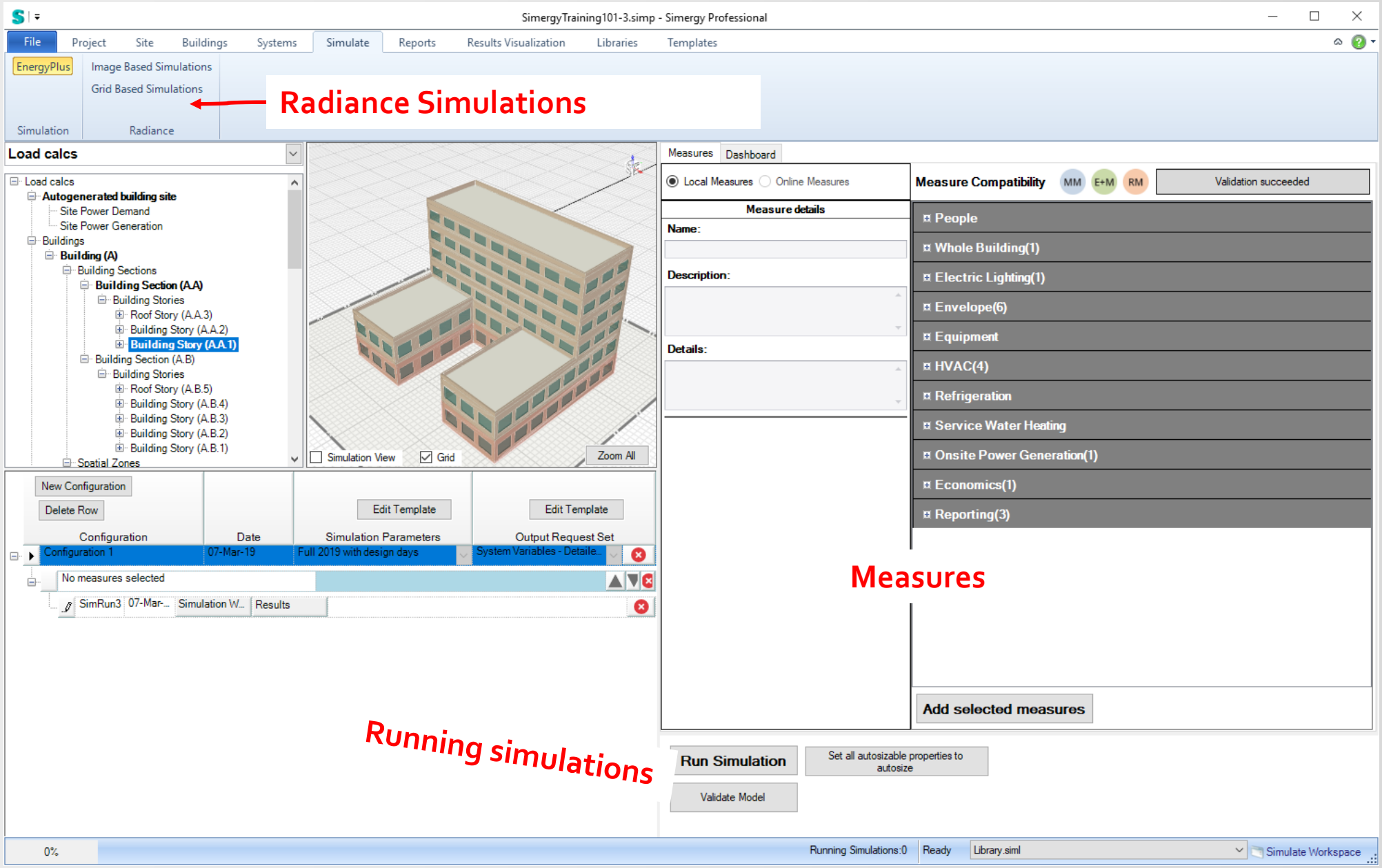
Systems workspace



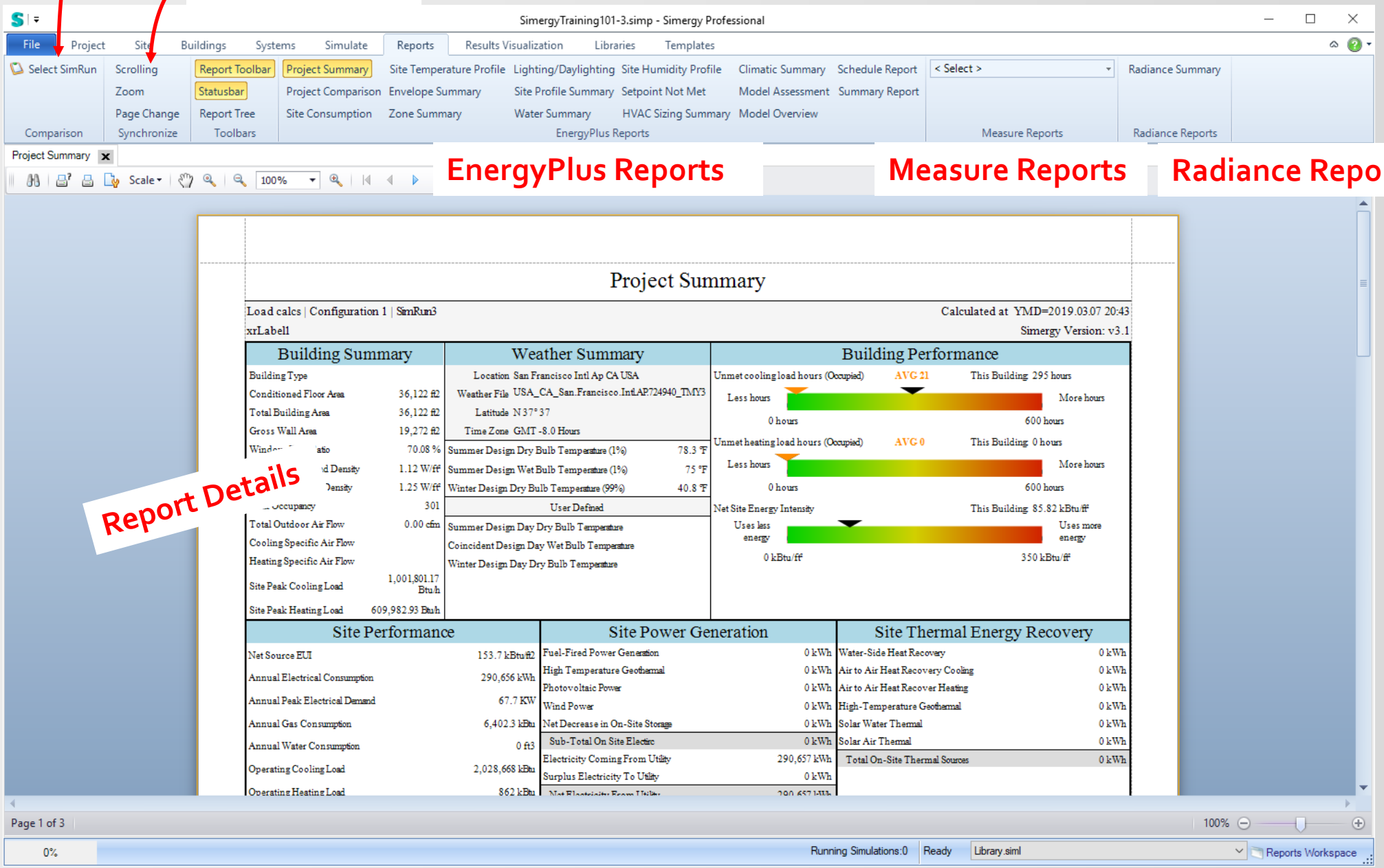
Simulate workspace



Resports workspace

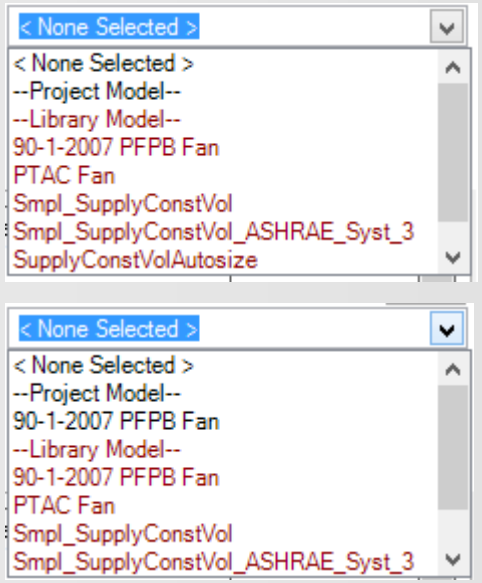
Select run

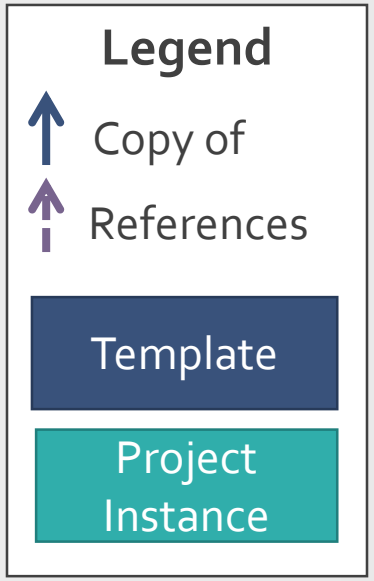
Synchronize

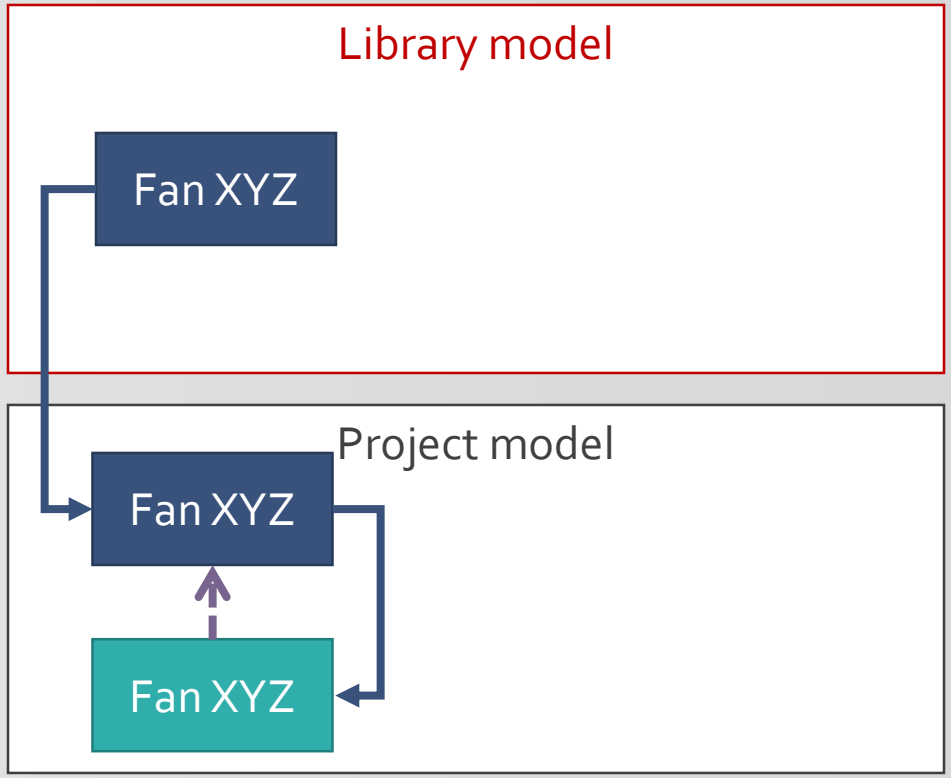


Library concept

- Library models versus project model
- Selecting a component in the library







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Standard/Professional Simergy version

Feature area	Standard	Professional (4 weeks trial)
User support	Limited	Full
Multiple design alternatives and comparison of simulation results	✓	✓
Building Model Creator (basic = 15 thermal zones)	Basic	Full
Air Loops	Basic (1)	Full (3)
Water Loops	Basic (3)	Full (7)
Advanced HVAC systems (VRF, PV, solar thermal, CHP)		✓
Model validation checking	Basic	Full
Results reporting	Basic	Full
Libraries and Templates	Basic	Advanced
UI Features	Basic	Full
Issue Resolution Knowledgebase		✓
Results Visualization		✓
Exporting of building models		✓

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http://d-alchemy.com/simergy/comparefreevsfree

Design questions

1. How do I calculate loads with Simergy?
   Lesson 1a & 1b
2. How much energy can we save by using triple low-e instead of double glazed windows?
   Lesson 2 &3
3. What is the difference in energy performance between an air to air heat pump and a typical VAV water cooled and heated system (ASHRAE7)?
   Lesson 4 & 5

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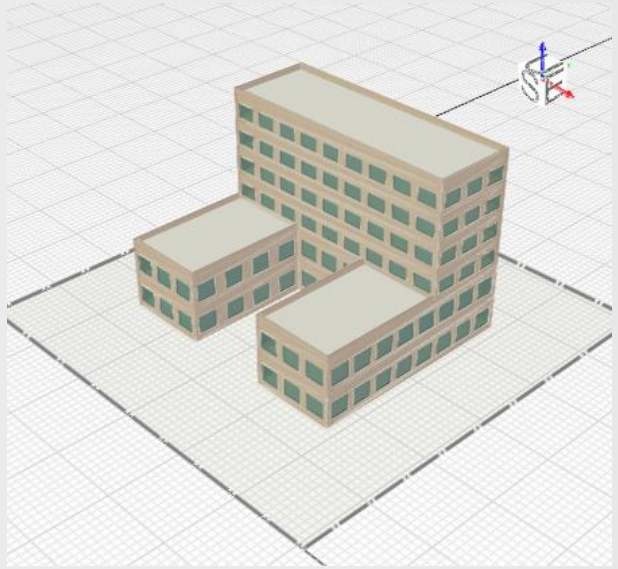
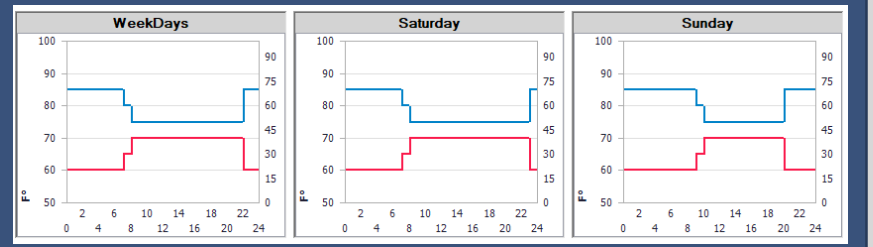
Mixed use building



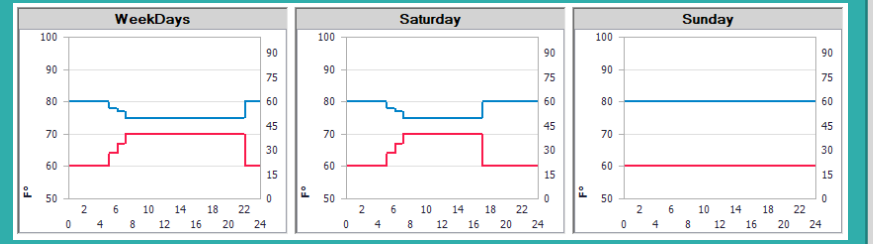
- 2 story U-space retail building section
  - High ceilings
  - Larger windows
- 4 story rectangle office building section
  - Typical ceiling heights
  - Typical Window to wall ratio

Thermostat schedules

Retail

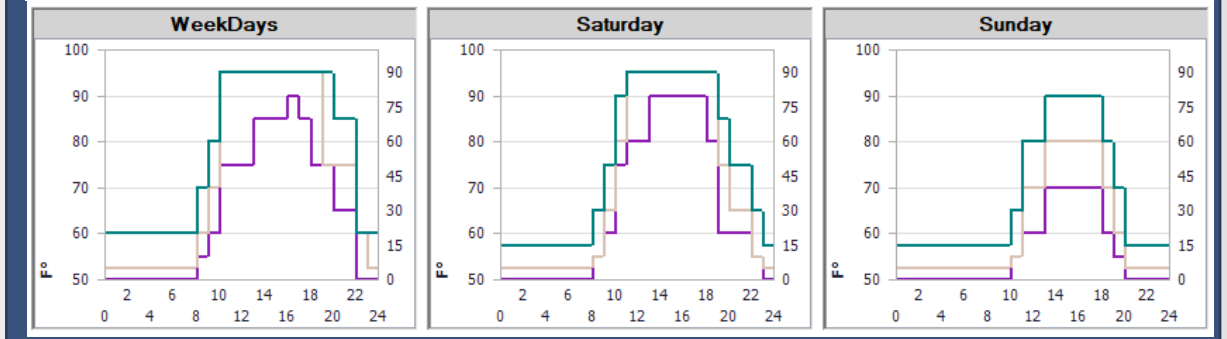


Office



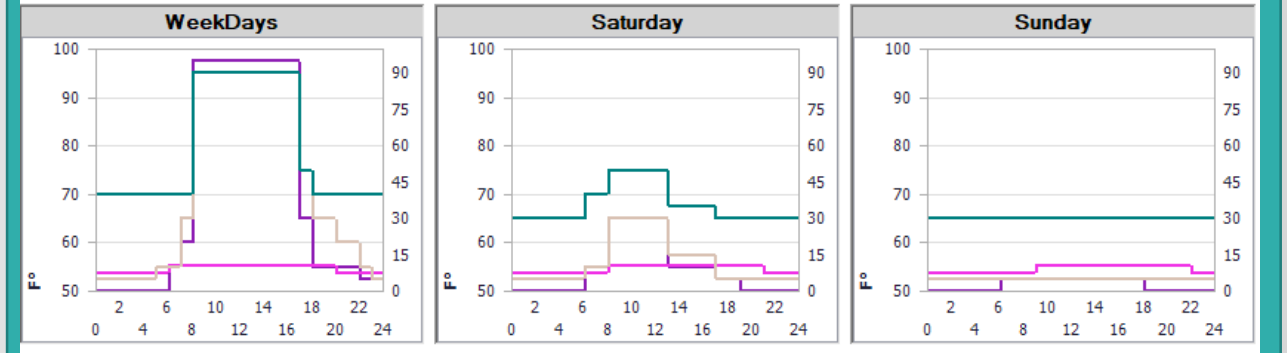
Retail internal loads

Load Type	Load Definition		Schedule		Value Type	Value	Unit
People	Bldg-Retail Occupancy ASHRAE	...	COMNET C-8 Retail-Occupancy	...	Area/Person	67	ft2/person
Lights	Bldg-Retail Lights ASHRAE90.1-	...	COMNET C-8 Retail-Lights Sche	...	Watts/Area	1.5	W/ft2
Electric Outlets	Bldg-Retail Receptacle ASHRAE	...	COMNET C-8 Retail-Receptacle	...	Watts/Area	0.3	W/ft2



Office internal loads

Load Type	Load Definition		Schedule		Value Type	Value	Unit
People	Bldg-Office Occupancy ASHRAE	...	COMNET C-5 Office-Occupancy	...	Area/Person	200	ft2/person
Lights	Bldg-Office Lights ASHRAE90.1-	...	COMNET C-5 Office-Lights Sche	...	Watts/Area	1	W/ft2
Electric Outlets	Bldg-Office Receptacle ASHRAE	...	COMNET C-5 Office-Receptacle	...	Watts/Area	0.75	W/ft2



Demo Model Creator – Lesson 1

How do I calculate loads with Simergy?

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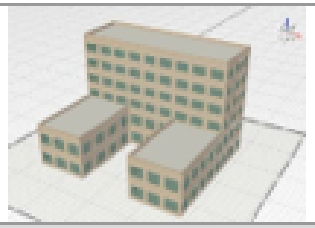
Lesson 1: Create basic model

Lesson 1a: Mixed use model with load calculations – Design Alternative		
1	Click on the **File** Menu	
2	Click on the New Menu-Button to create a new project.	
3	In the **Project** workspace	
4	In the Project Information palette	
5	For **Design Alternative 1**, set the **Region** dropdown to	*"CA"*
6	Set the **Location** dropdown to (or type in "San F" to filter the list) This loads the weather data for the project.	*"San Francisco Intl Ap"*
7	Rename the **Design Alternative 1** to	*"Load calculation"*

Create/Edit Design Alternatives

New | Copy | Validate Model | Delete

Name	Description	Weather Source	Region	Location
Load calculation	Automatically generated Baseli...	Standard	CA	**San Francisco Intl Ap**

8	Go to the **Buildings** Workspace	
9	In the **Create/Edit Buildings** ribbon menu	
10	In the **Create/Edit Building** palette	
11	Click on the **Building Sections** tab	

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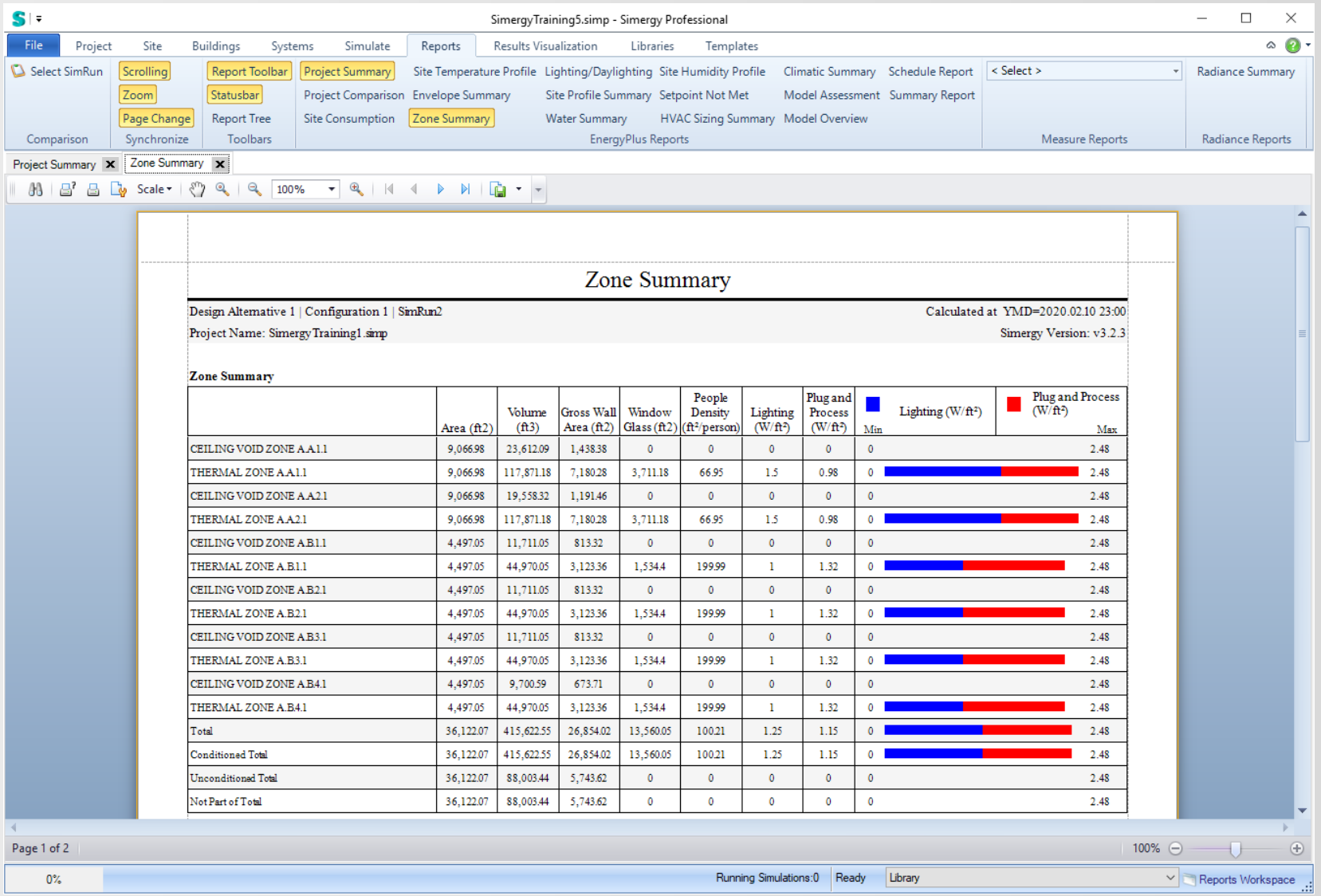
Zone Summary Report – Zone Loads



	Area (ft2)	Volume (ft3)	Gross Wall Area (ft2)	Window Glass (ft2)	People Density (ft²/person)	Lighting (W/ft²)	Plug and Process (W/ft²)	Lighting (W/ft²) Min	Lighting (W/ft²) Max	Plug and Process (W/ft²) Min	Plug and Process (W/ft²) Max
CEILING VOID ZONE A.A1.1	9,066.98	23,612.09	1,438.38	0	0	0	0	0			2.48
THERMAL ZONE A.A1.1	9,066.98	117,871.18	7,180.28	3,711.18	66.95	1.5	0.98	0			2.48
CEILING VOID ZONE A.A2.1	9,066.98	19,558.32	1,191.46	0	0	0	0	0			2.48
THERMAL ZONE A.A2.1	9,066.98	117,871.18	7,180.28	3,711.18	66.95	1.5	0.98	0			2.48
CEILING VOID ZONE A.B1.1	4,497.05	11,711.05	813.32	0	0	0	0	0			2.48
THERMAL ZONE A.B1.1	4,497.05	44,970.05	3,123.36	1,534.4	199.99	1	1.32	0			2.48
CEILING VOID ZONE A.B2.1	4,497.05	11,711.05	813.32	0	0	0	0	0			2.48
THERMAL ZONE A.B2.1	4,497.05	44,970.05	3,123.36	1,534.4	199.99	1	1.32	0			2.48
CEILING VOID ZONE A.B3.1	4,497.05	11,711.05	813.32	0	0	0	0	0			2.48
THERMAL ZONE A.B3.1	4,497.05	44,970.05	3,123.36	1,534.4	199.99	1	1.32	0			2.48
CEILING VOID ZONE A.B4.1	4,497.05	9,700.59	673.71	0	0	0	0	0			2.48
THERMAL ZONE A.B4.1	4,497.05	44,970.05	3,123.36	1,534.4	199.99	1	1.32	0			2.48
Total	36,122.07	415,622.55	26,854.02	13,560.05	100.21	1.25	1.15	0			2.48
Conditioned Total	36,122.07	415,622.55	26,854.02	13,560.05	100.21	1.25	1.15	0			2.48
Unconditioned Total	36,122.07	88,003.44	5,743.62	0	0	0	0	0			2.48
Not Part of Total	36,122.07	88,003.44	5,743.62	0	0	0	0	0			2.48

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Zone Summary Report – Calculate Loads

Design Day: Zone Cooling (1%) and Heating (99%)

		Calculated Design Load (Btu/h)	User Design Load (Btu/h)	Calculated Design Air Flow (cfm)	User Design Air Flow (cfm)	Date of Peak	External Temperature at Peak (°F)	Humidity Ratio at Peak (lb-H2O/lb-air)	Calculated Cooling Load (Btu/h) Min	Calculated Heating Load (Btu/h) Max
THERMAL ZONE A.A1.1	Cooling	242,151.9	278,474.7	12,376.4	14,232.5	8/21 16	77.14	0.00819	0	291530.9
	Heating	80,313.3	100,391.6	2,080.7	2,602	1/21 11	40.82	0.00537	0	97735.4
THERMAL ZONE A.A2.1	Cooling	291,530.9	335,260.5	14,900	17,135.4	8/21 16	76.32	0.00819	0	291530.9
	Heating	97,735.4	122,169.2	2,542.7	3,178.3	1/21 11	40.82	0.00537	0	97735.4
THERMAL ZONE A.B1.1	Cooling	107,729.1	123,888.4	4,898.9	5,634.1	8/21 14	78.26	0.00819	0	291530.9
	Heating	17,920.5	22,400.6	262.7	381.4	1/21 05	40.82	0.00537	0	97735.4
THERMAL ZONE A.B2.1	Cooling	107,582.3	123,719.6	4,892.5	5,627.7	8/21 14	78.26	0.00819	0	291530.9
	Heating	17,978.5	22,473.1	264.9	381.4	1/21 05	40.82	0.00537	0	97735.4
THERMAL ZONE A.B3.1	Cooling	107,458	123,576.7	4,888.3	5,621.4	8/21 14	78.26	0.00819	0	291530.9
	Heating	18,035.1	22,543.9	264.9	381.4	1/21 05	40.82	0.00537	0	97735.4
THERMAL ZONE A.B4.1	Cooling	107,347.7	123,449.9	4,881.9	5,615	8/21 14	78.26	0.00819	0	291530.9
	Heating	18,090.9	22,613.6	264.9	381.4	1/21 05	40.82	0.00537	0	97735.4

Calculated loads: Calculated based on design day
User design loads: Calculated loads including sizing factors and OA requirements

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Demo Model Creator – Lesson 2

How much energy can we save by using
triple low-e instead of **double glazed** windows?

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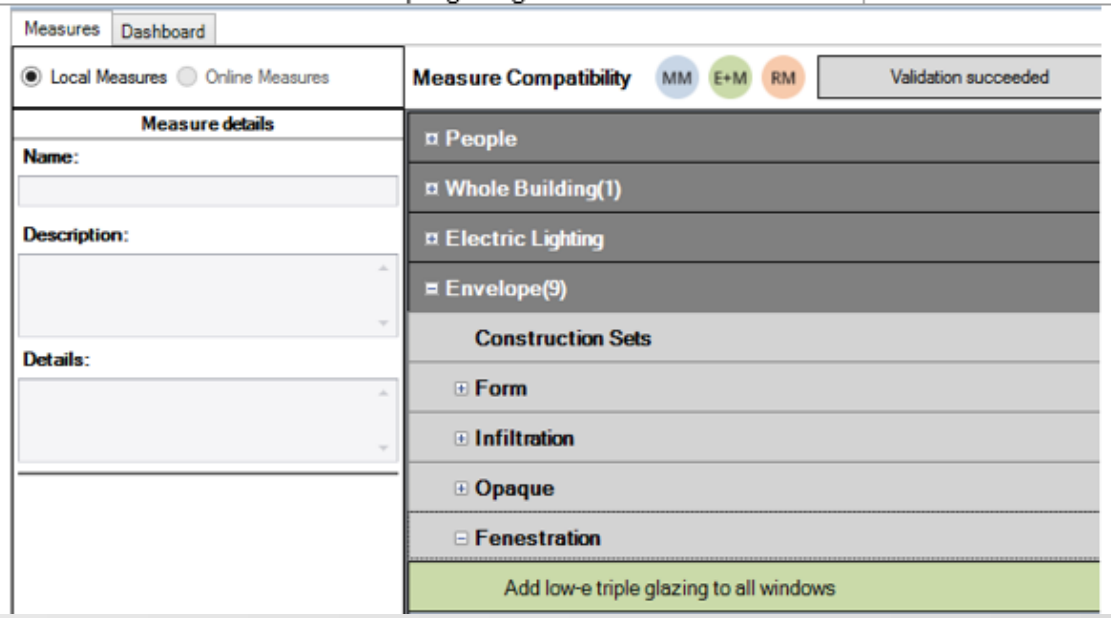
Lesson 2: Replacing windows

Lesson 2: DESIGN ALTERNATE 2 – Triple glazing with low-e with Measure		
67	In the **Project** workspace	
68	In the Project Information palette	
69	Select the **"Load calculation"** design alternative and click on the **Copy** button	
70	Rename the **Design Alternative 1** to	*"Triple Glazing 2"*
71	Go to the **Simulate** Workspace	
72	In the **EnergyPlus** ribbon menu	
73	In the right palette	
74	Click on the plus in front of **Envelope.** Click on the plus left of **Fenestration** Locate the "Add low-e triple glazing to all windows" Measure	



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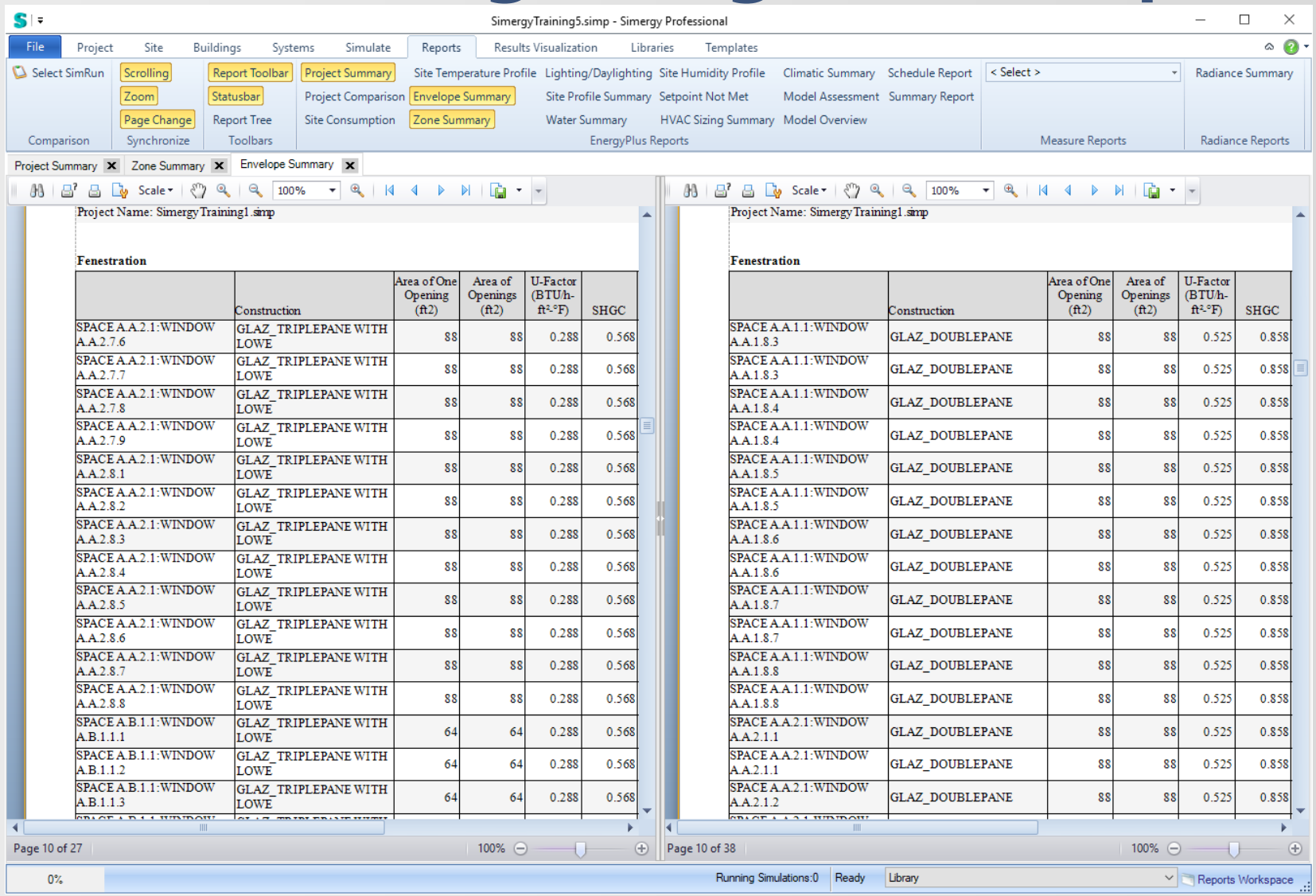
Results – Low-E glazing – Envelope summary



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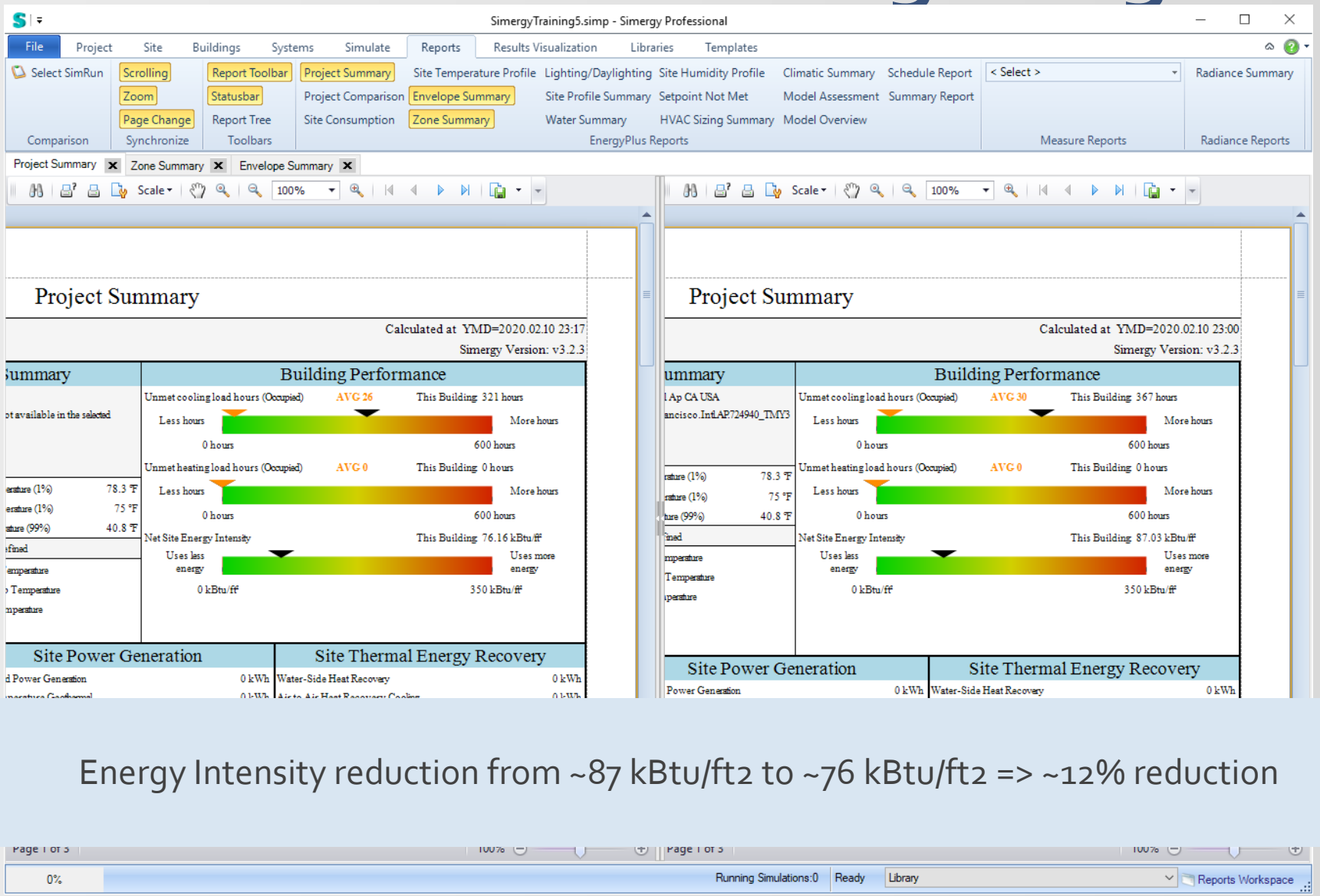
Results – Low-E glazing



Energy Intensity reduction from ~87 kBtu/ft2 to ~76 kBtu/ft2 => ~12% reduction

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Demo Model Creator – Lesson 3&4

What is the difference in energy performance between an **air to air heat pump** and a typical **VAV water cooled and heated system (ASHRAE7)?**

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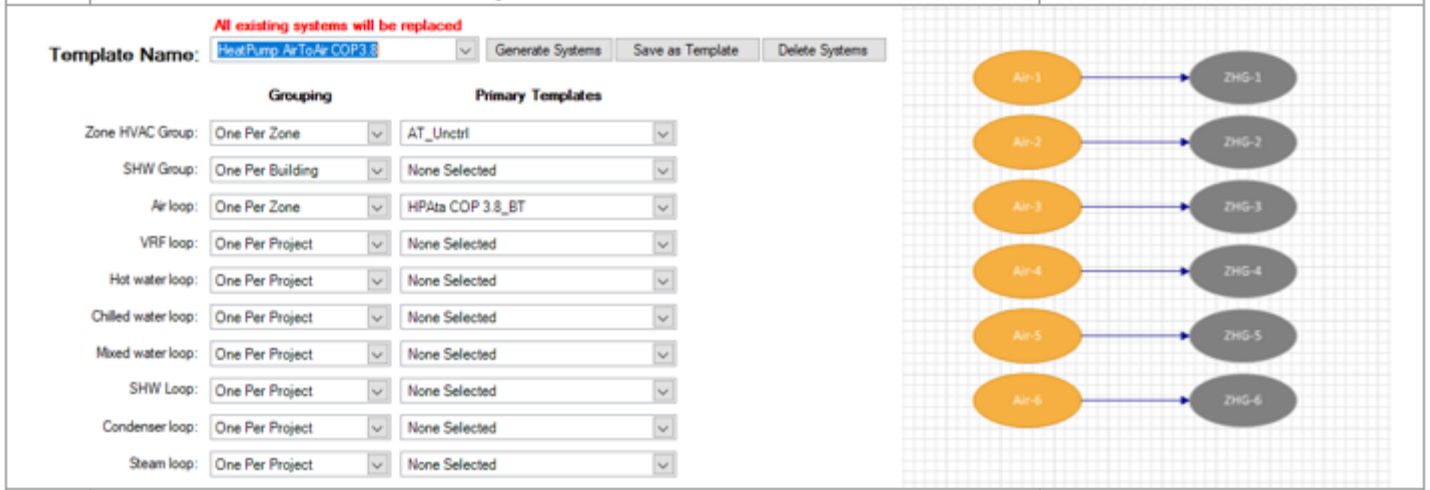
Lesson 3: HeatPump Air to Air

Lesson 3: DESIGN ALTERNATE 3 – Air to air heat pump		
91	In the **Project** workspace	
92	In the Project Information palette	
93	Select the **"Triple Glazing 2"** design alternative and click on copy	
94	Rename the **Design Alternative 1** to	*"Air to Air Heat Pump"*
95	Go to the **Systems** Workspace	
96	In the **Systems Creator** ribbon menu	
97	Select the **Template Name** dropdown as	*"HeatPump AirToAir COP3.8"*
98	Set the dropdown for Zone HVAC Groups and Air loops to	"One per zone"
99	Click on **Generate Systems**	



100	Click on the **File** Menu	
101	Click on the **SaveAs** Button to save the current model.	
102	Set **File name** to	*"BasicTraining4"*
103	Go to the **Simulate** Workspace	

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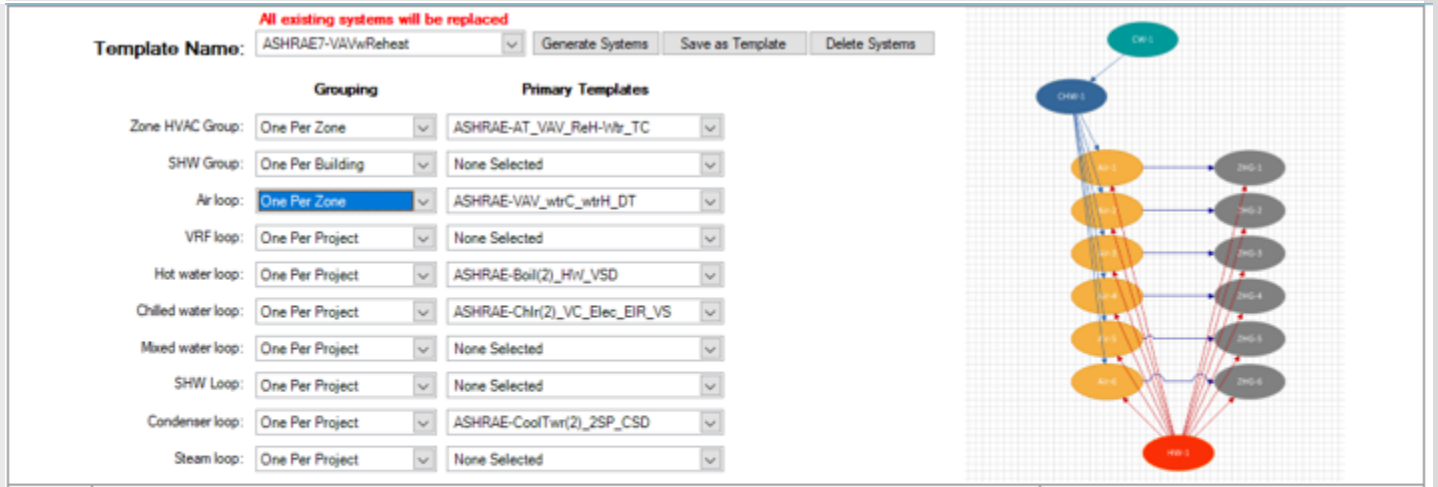
Lesson 4: ASHRAE-7

Lesson 4: DESIGN ALTERNATE 4 – ASHRAE-7		
111	In the **Project** workspace	
112	In the Project Information palette	
113	Select the **"Triple Glazing 2"** design alternative and click on copy	
114	Rename the Design Alternative 4 to	*"ASHRAE-7"*
115	Go to the **Systems** Workspace	
116	In the **Systems Creator** ribbon menu	
117	Select the **Template Name** dropdown as	*"ASHRAE-7"*
118	Set the dropdown for Zone HVAC Groups and Air loops to	"One per zone"
119	Click on **Generate Systems**	



120	Click on the **File** Menu	
121	Click on the **SaveAs** Button to save the current model.	
122	Set **File name** to	*"BasicTraining5"*
123	Go to the **Simulate** Workspace	

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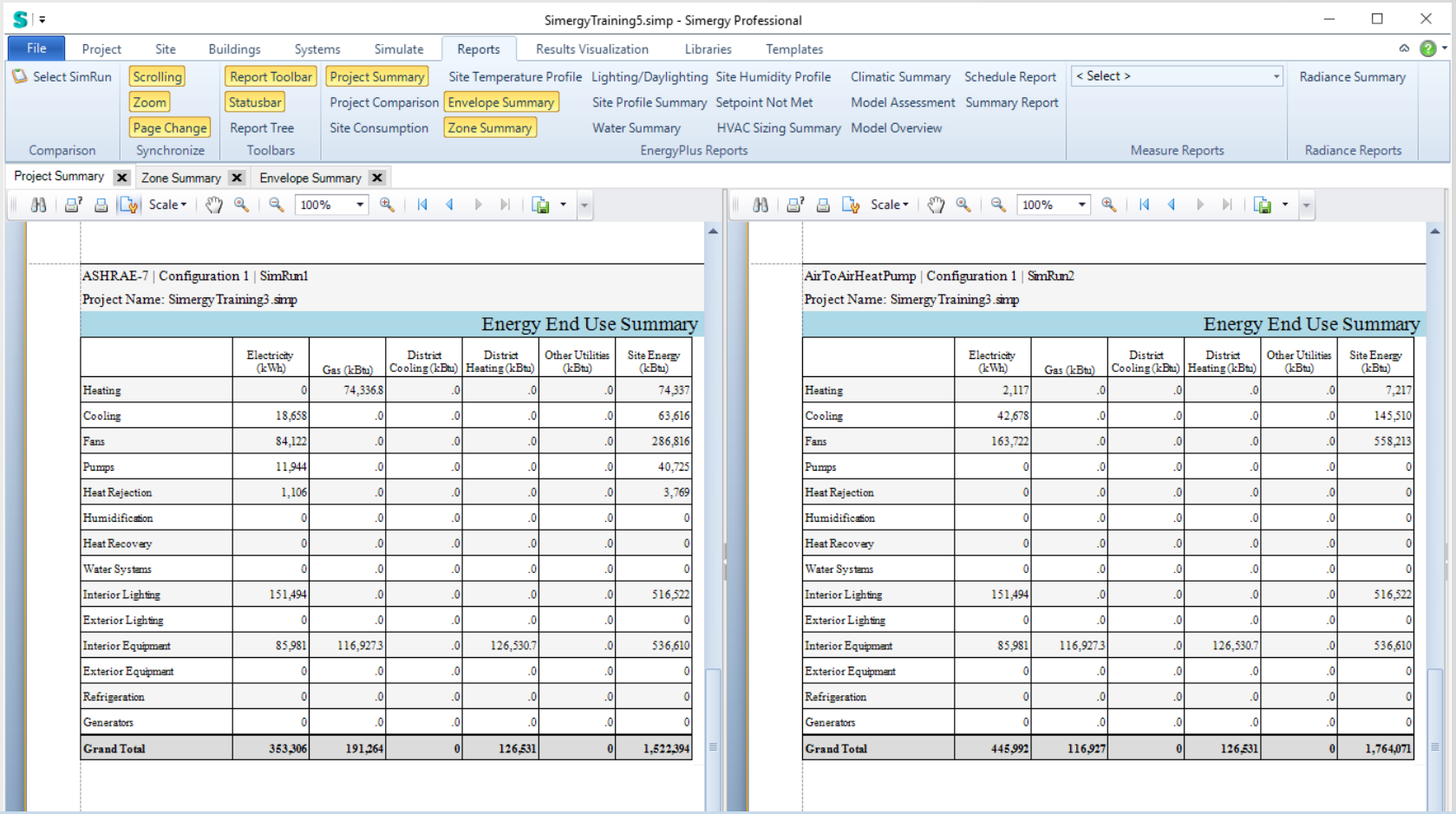
Results – System comparison



ASHRAE-7 | Configuration 1 | SimRun1

Project Name: SimergyTraining3.simp

Energy End Use Summary

	Electricity (kWh)	Gas (kBtu)	District Cooling (kBtu)	District Heating (kBtu)	Other Utilities (kBtu)	Site Energy (kBtu)
Heating	0	74,336.8	.0	.0	.0	74,337
Cooling	18,658	.0	.0	.0	.0	63,616
Fans	84,122	.0	.0	.0	.0	286,816
Pumps	11,944	.0	.0	.0	.0	40,725
Heat Rejection	1,106	.0	.0	.0	.0	3,769
Humidification	0	.0	.0	.0	.0	0
Heat Recovery	0	.0	.0	.0	.0	0
Water Systems	0	.0	.0	.0	.0	0
Interior Lighting	151,494	.0	.0	.0	.0	516,522
Exterior Lighting	0	.0	.0	.0	.0	0
Interior Equipment	85,981	116,927.3	.0	126,530.7	.0	536,610
Exterior Equipment	0	.0	.0	.0	.0	0
Refrigeration	0	.0	.0	.0	.0	0
Generators	0	.0	.0	.0	.0	0
Grand Total	**353,306**	**191,264**	**0**	**126,531**	**0**	**1,522,394**

AirToAirHeatPump | Configuration 1 | SimRun2

Project Name: SimergyTraining3.simp

Energy End Use Summary

	Electricity (kWh)	Gas (kBtu)	District Cooling (kBtu)	District Heating (kBtu)	Other Utilities (kBtu)	Site Energy (kBtu)
Heating	2,117	.0	.0	.0	.0	7,217
Cooling	42,678	.0	.0	.0	.0	145,510
Fans	163,722	.0	.0	.0	.0	558,213
Pumps	0	.0	.0	.0	.0	0
Heat Rejection	0	.0	.0	.0	.0	0
Humidification	0	.0	.0	.0	.0	0
Heat Recovery	0	.0	.0	.0	.0	0
Water Systems	0	.0	.0	.0	.0	0
Interior Lighting	151,494	.0	.0	.0	.0	516,522
Exterior Lighting	0	.0	.0	.0	.0	0
Interior Equipment	85,981	116,927.3	.0	126,530.7	.0	536,610
Exterior Equipment	0	.0	.0	.0	.0	0
Refrigeration	0	.0	.0	.0	.0	0
Generators	0	.0	.0	.0	.0	0
Grand Total	**445,992**	**116,927**	**0**	**126,531**	**0**	**1,764,071**

ASHRAE7 performs better then AirToAirHeatPump by 16%

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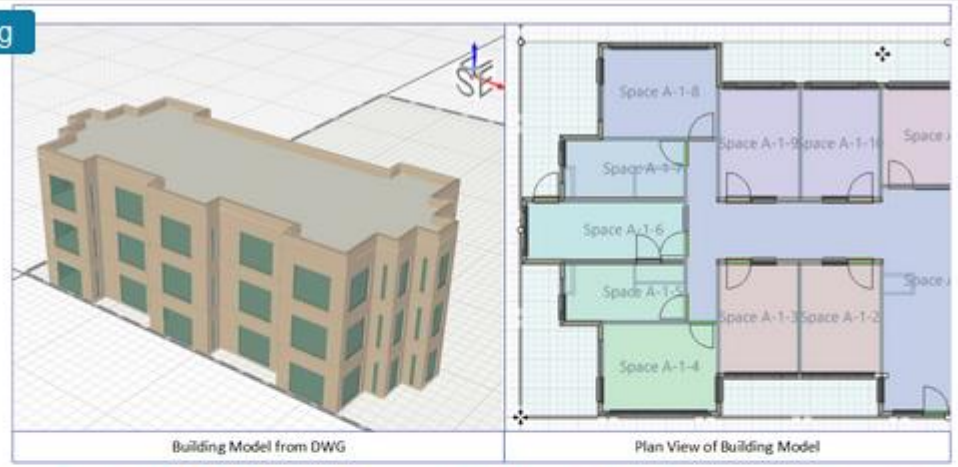
Additional training courses

Training

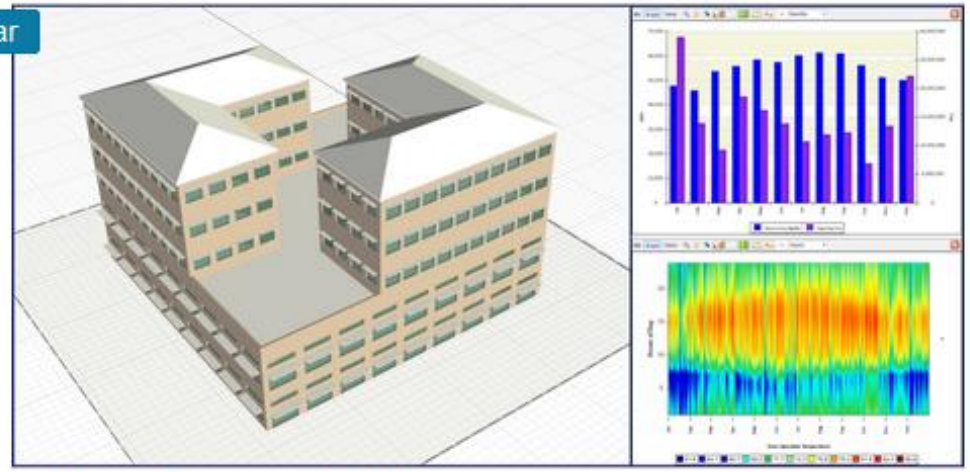


Training 102: DWG Model-Over, Editing HVAC Loops, Results Visualization

In this 2-hour session, you will learn to create building models from DWG drawings, create HVAC loops, and create graphs/charts from simulation results.

Date: 25 Feb 2020 | Time: 08:00 PM to 10:00 PM (CET) | Click to Sign up

Webinar



Webinar: How to answer building energy questions in early design (US Units)

In this session, you will see how Simergy users answer building energy questions in early stages of design, by creating and simulating a building model.

Date: 17 Mar 2020 | Time: 07:00 PM to 08:00 PM (CET) | Click to Sign up

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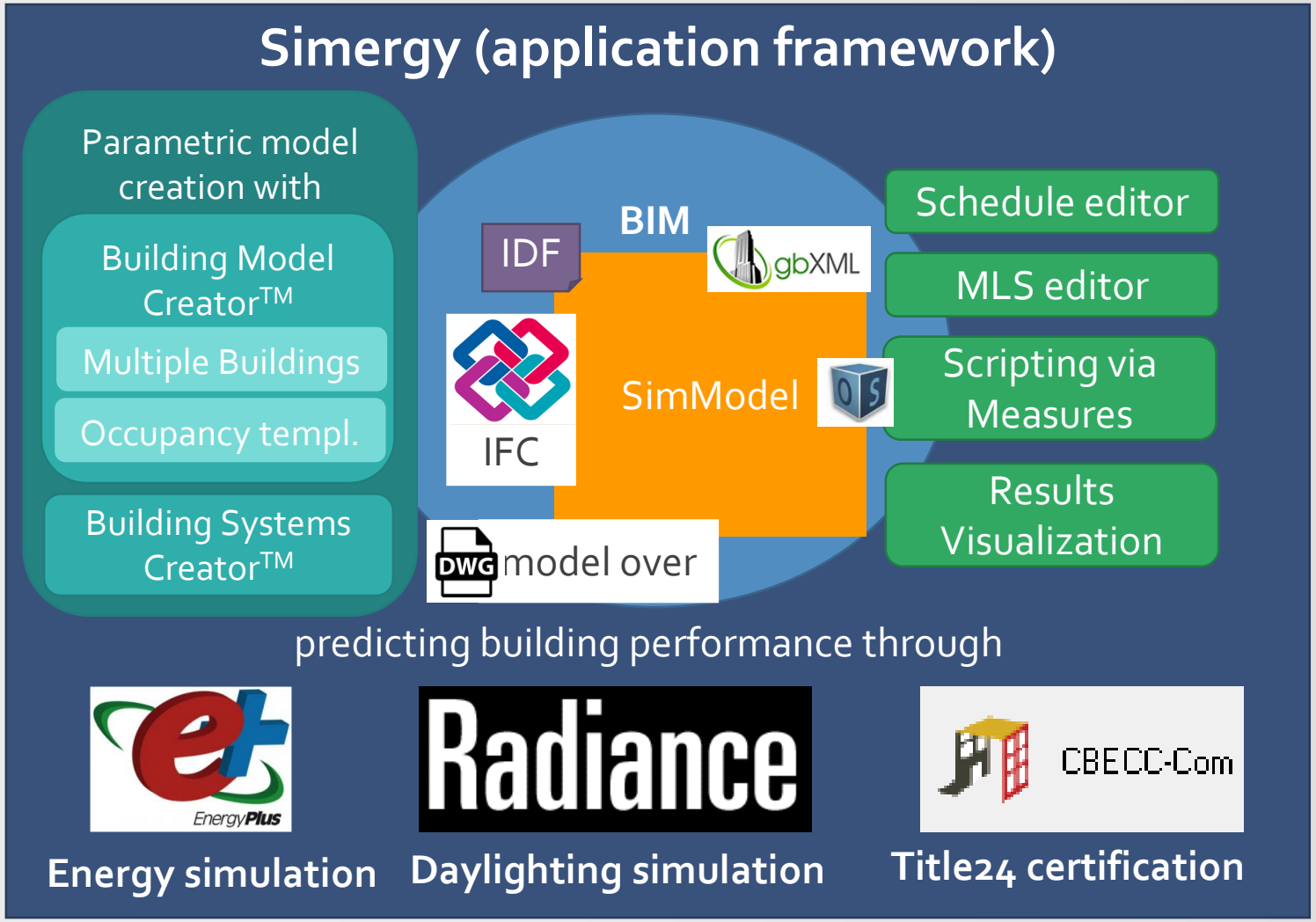
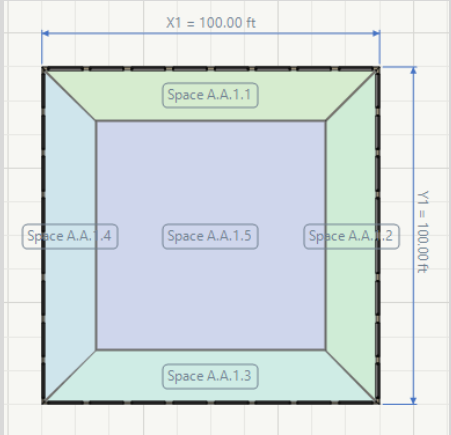
http://d-alchemy.com/events

New features in Simergy 3.2



1. Updated ASHRAE content to 2016
2. Added ASHRAE system 9 & 10
3. Dimensions in plan view



4. Auto adjusting schedules for mixed occupancy
5. Improvements throughout
   1. Building Model and Systems Creator
   2. Space boundary generation
   3. Import/Export/Validation
   4. More samples, etc..

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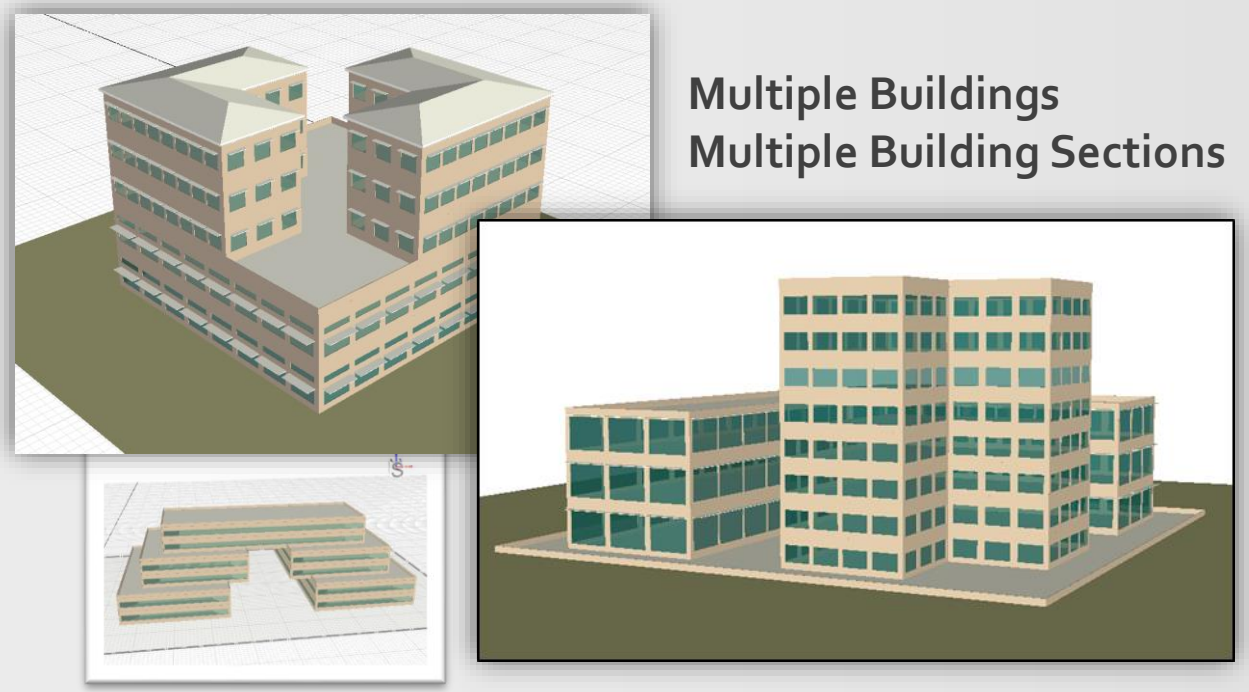
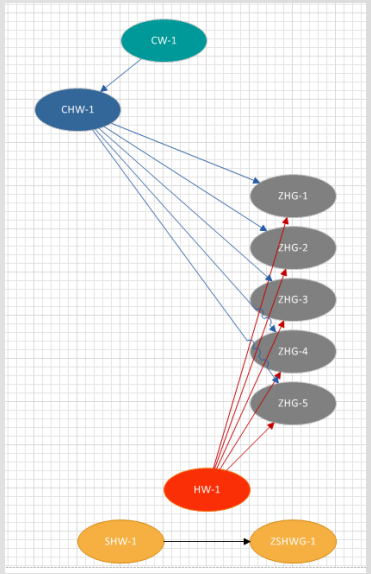
New features since Simergy 3 (1)



Multiple Buildings
Multiple Building Sections



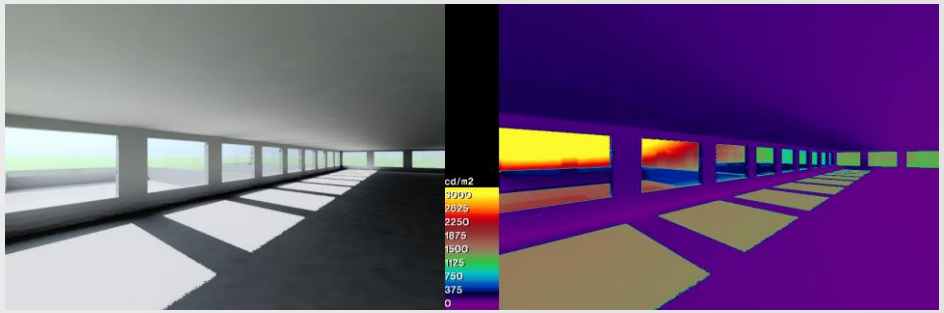
Building Systems Creator

All existing systems will be replaced

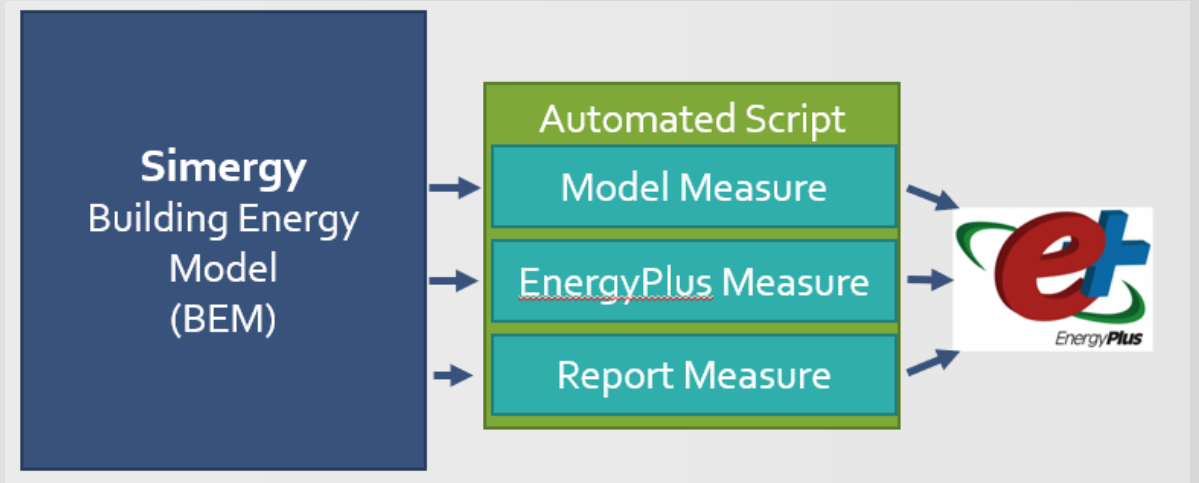
Template Name: ASHRAE7-VAVwReheat + SHW | Generate Systems | Save as Template

	Grouping	Primary Templates
Zone HVAC Group:	One Per Building	ASHRAE-AT_VAV_ReH-Wtr_TC
SHW Group:	One Per Building	Office building 1 gal/day/person - 104 d
Air loop:	One Per Building	ASHRAE-VAV_wtrC_wtrH_DT
VRF loop:	One Per Project	None Selected
Hot water loop:	One Per Project	ASHRAE-Boil(2)_HW_VSD
Chilled water loop:	One Per Project	ASHRAE-Chlr(2)_VC_Elec_EIR_VS
Mixed water loop:	One Per Project	None Selected
SHW Loop:	One Per Project	Heater Natural Gas - 135 deg F - AS 1
Condenser loop:	One Per Project	ASHRAE-CoolTwr(2)_2SP_CSD
Steam loop:	One Per Project	None Selected

Daylighting with Radiance



Scripted model changes



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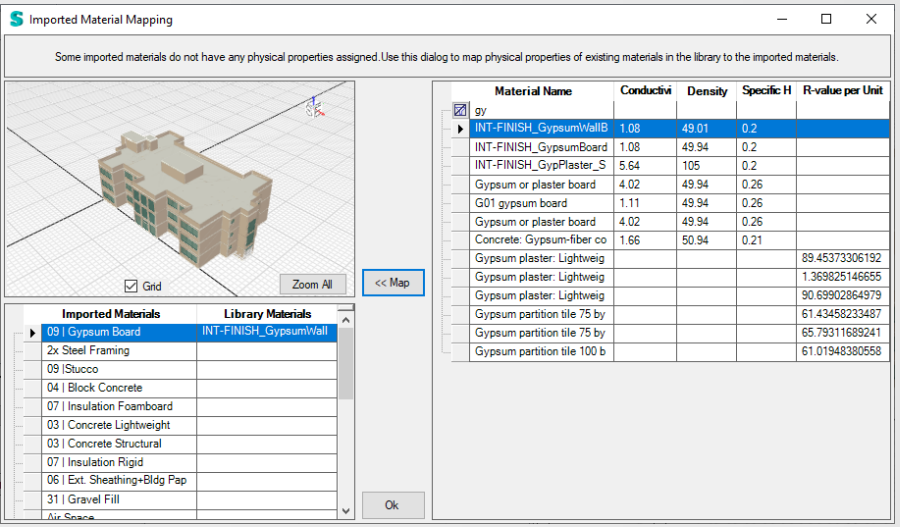
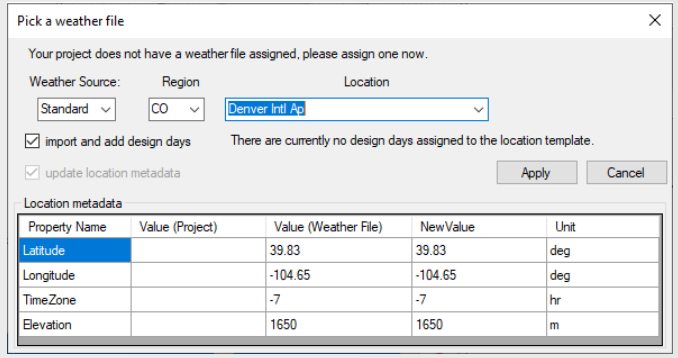
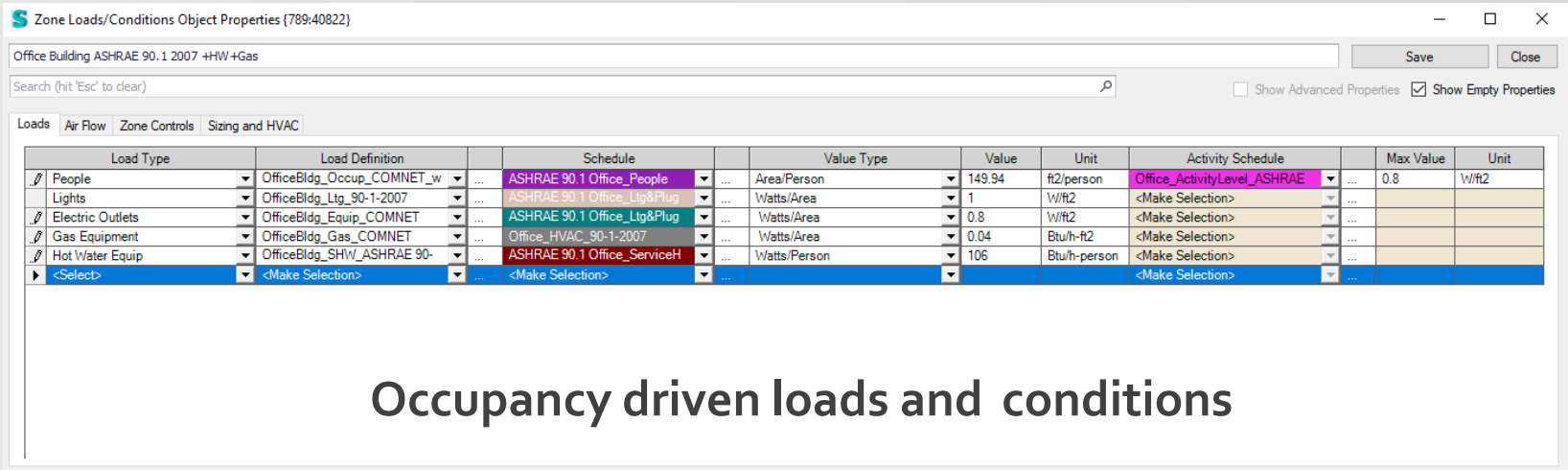
New features since Simergy 3 (2)

Map materials during import



Pick a weather file just in time





Occupancy driven loads and conditions

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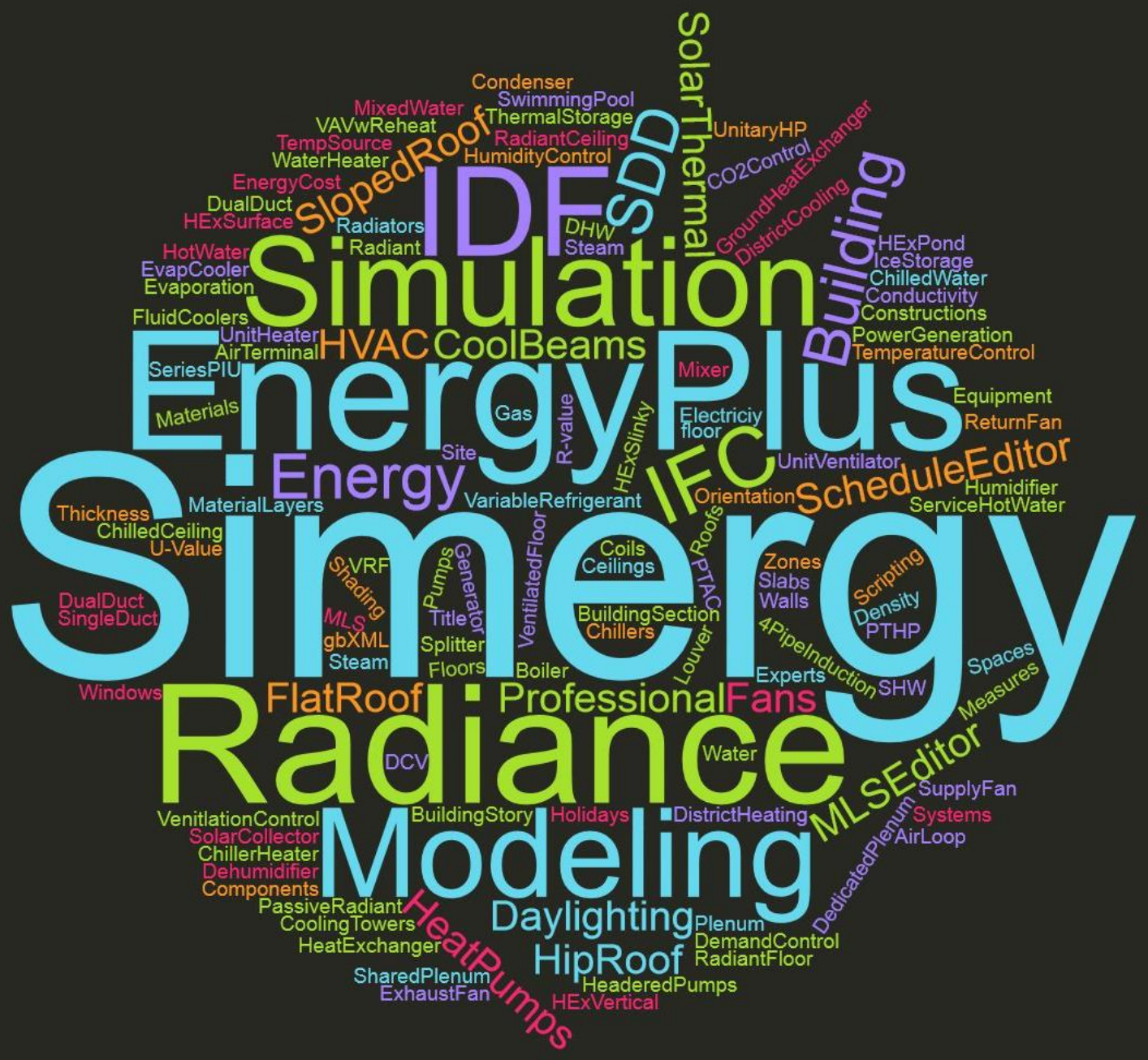

Feedback and/or Questions?

- New website: d-alchemy.com
- Email support: Support@D-Alchemy.com
- Topics you would need help with?