



Rater Provider Monthly Webinar

REM Rate Modeling Tips

March 23rd 2013

Emelie Cuppernell and Ethan MacCormick

Using Your Toolbar

To expand or minimize the
view, click here

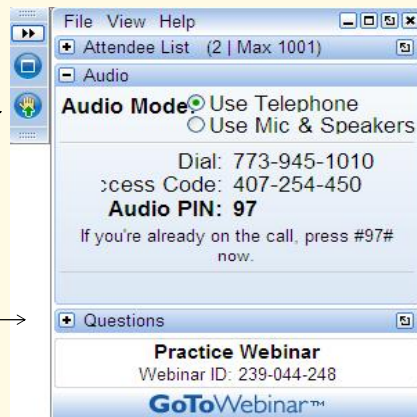
To raise your hand, click here

To access, expand or minimize:

Attendee List

Audio

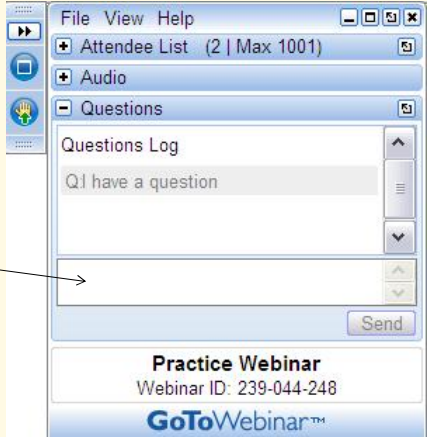
Questions



PERFORMANCE SYSTEMS
DEVELOPMENT

Asking questions

Type questions here
and click "Send"



File View Help
+ Attendee List (2 | Max 1001)
+ Audio
- Questions
Questions Log
Q.I have a question
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Practice Webinar
Webinar ID: 239-044-248
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PERFORMANCE SYSTEMS
DEVELOPMENT

Today

- Model Updates
 - › REM 14.2
- Basic Model Set up
 - › Default Building
 - › Required Information
- Modeling GSHP
- Modeling integrated space/water heating systems
- Tax Credit Compliance
- IECC 2009 glitch
- Common Mistakes
 - › Simple Checks
 - › Reset window layout

REM 14.2 is here

- **Update is you haven't already:**
<http://www.archenergy.com/products/remrate/license-and-download-remrate>

Enhancements in REM/Rate™ v14.2 include:

Basic Model Set Up

- Set a default building with Rating Organization Information

The screenshot displays the REM/Rate v13.0 software interface. On the left, a menu bar includes 'File', 'Building', 'View', 'Extras', 'Libraries', and 'Rep'. Below the menu, a list of actions is shown: 'New Building', 'Open Building...', 'Close Building', 'Save Building', 'Save Building As...', 'Delete Building...', 'Set to Default Building' (highlighted in orange), and 'Delete Default Building'. On the right, the 'Rating Organization Information' dialog box is open, containing the following fields:

Rating Organization Name: PSD	
Address: 124 Brindley Street	
City: Ithaca	
State: NY	Zip: 14867
Phone Number: 607-277-6240	
Website: www.psdconsulting.com	
Rater's Name: Emelie Cuppenell	
Email: ecuppenell@psdconsulting.com	
RESNET:	
Provider ID (AIN): 1998-072	Rater ID (RTIN):
Sampled Set ID: 00000000	Registry ID:
Energy Rating Information:	

Required Model Inputs

Rating Organization Information:

Rating Organization Name: PSD

Address: 124 Brindley Street

City: Ithaca

State: NY Zip: 14867

Phone Number: 607-277-6240

Website: www.psdconsulting.com

Rater's Name: Emelie Cuppernell

Email: ecuppernell@psdconsulting.com

RESNET:

Provider ID (AIN): 1998-072 Rater ID (RTIN):

Sampled Set ID: 00000000 Registry ID:

Energy Rating Information:

Rating Date: 9/18/12

Rating Type: Confirmed

Reason For Rating: New Home

Rating Number:

- Rating Date should be the date of Plan Review for a Projected Rating, or the date of Final Inspection for a Confirmed Rating.

Required Data

Building Name:

Property Information:

Owner's Name:

Property Address:

City:

State: Zip:

Phone Number:

Builder Information:

Builder's Name:

Builder's Address:

Builder's Email:

Phone Number:

Plan/Model Name:

Community/Development:

Permit Date/Number:

Exception: Projected Ratings address not known

Required for new Construction
Used to report to EPA

For ENERGY STAR

Required Data

Marking any given checkbox certifies that the home complies with all mandatory requirements referenced by that checkbox. Needed for showing compliance on various reports.

IECC - Mandatory Requirements

☐ 2004 IECC
 ☐ 2009 IECC
 ☐ 2010 NY IECC
 ☐ 2006 IECC
 ☐ 2012 IECC

ENERGY STAR Version 2

☐ Thermal Bypass Checklist ...
 ☐ ENERGY STAR Products

ENERGY STAR Version 2.5 and 3.0

Checklists Fully Enforced for 3.0

☐ Thermal Enclosure
☐ HVAC System Quality Installation Contractor
☐ HVAC System Quality Installation Rater
☐ Water Management System Builder
☐ Indoor airPlus Verification

ENERGY STAR Product Count

☐ # Refrigerators: 0
☐ # Ceiling Fans: 0
☐ # Exhaust Fans: 0
☐ # Dishwashers: 0

Conditioned Basement Exclusion

☐ Basement Qualifies for SAF exclusion?
 Basement Conditioned Floor Area: 0

- Check here if a building is failing for apparently no reason

Entering Surfaces

Above-Grade Wall Properties Summary

#	Name	Type	U-Value	Area
1	R-19, R-5 Conc.		0.040	1320.0
2	R-19, R-5 Conc.		0.040	620.0
3	R-19, R-5 Conc.		0.040	720.0
4	R-19, R-5 Conc.		0.040	1200.0

Above-Grade Wall Properties

Name:
 Type: R-19, R-5 Conc. U=0.040 ...
 Gross Area (sq ft): 1320.0 Exterior Color: Modular
 Location: Between conditioned space and ambient

=

Above-Grade Wall Properties Summary

#	Name	Type	U-Value	Area
1	R-19, R-5 Conc.		0.040	3700.0

Above-Grade Wall Properties

Name:
 Type: R-19, R-5 Conc. U=0.040 ...
 Gross Area (sq ft): 3700.0 Exterior Color: Modular
 Location: Between conditioned space and ambient

GSHP Modeling: The Problem

- Using the GSHP Library Type is not reliably accurate
- The GSHP Library Type requires **equipment efficiency** inputs (NOT INCLUDING loop contribution)
- Vendor calculated seasonal efficiencies already INCLUDE loop efficiency
- The GSHP Well screen approximates the ground loop contribution to come up with overall efficiency
- This method can seriously over-predict savings

Mechanical Equipment Properties

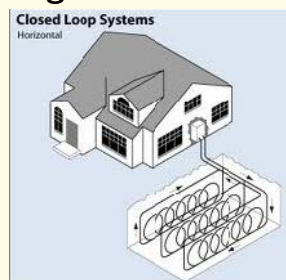
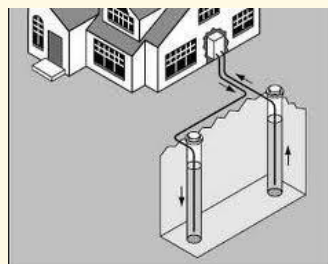
Library Type: Ground Source Heat Pump
Equipment: Space Heating
Location: Space Cooling
Performance: Water Heating
System-Wide Properties: Air-Source Heat Pump
Ground Source Heat Pump
Dual Fuel Heat Pump
Integrated Space/Water Heating

GSHP Well System

GSHP Wells: Vertical
Well Type: Vertical
Number of Wells: 9
Well Depth: 100
Loop Flow (gpm): 9.00

GSHP Modeling: The Solution

- Do not use the GSHP library type for either open or closed loop systems
- Model the GSHP as two inputs in REM using the Space Heating / Cooling libraries



GSHP Modeling: The details

- Where can I find efficiency numbers?
- Don't forget Pump Energy
- REM has fixed assumptions regarding soil characteristics

Ground Source Heat Pumps

Mechanical Equipment Properties Summary

#	Type	Htg Eff	Clg Eff	Dhw Eff
1	Open Loop Heat Pump	4.4 COP		
2	Groundwater A/C		16.7 EER	
3	Demand-Gas 0.80EF			

New Delete

Mechanical Equipment Properties

Library Type: Space Cooling

Equipment: Groundwater A/C

Location: Conditioned area

Performance Adj. (%): 100.0 Load Served (%):

Mechanical Equipment Properties Summary

#	Type	Htg Eff	Clg Eff
1	Open Loop Heat Pump	4.4 COP	
2	Groundwater A/C		16.7 EER
3	Demand-Gas 0.80EF		

New Delete

Mechanical Equipment Properties

Library Type: Space Heating

Equipment: Open Loop Heat Pump

Location: Conditioned area

Performance Adj. (%): 100.0 Load Served (%):

PERFORMANCE SYSTEMS DEVELOPMENT

GSHP – Heating Type Library

Name: ☒ Desuperheater

System Type:

Fuel Type:

Rated Output Capacity (kBtuh):

Seasonal Equipment Efficiency:

Auxiliary Electric Use:

Heat Pump - Auxiliary Inputs

Fan Power (Watts): ☒ Use Default

Pump Energy:

Note:

Name: ☒ Desuperheater

System Type:

Fuel Type:

Rated Output Capacity (kBtuh):

Seasonal Equipment Efficiency:

Auxiliary Electric Use: ☐ Use Default

Heat Pump - Auxiliary Inputs

Fan Power (Watts): ☒ Use Default

Pump Energy:

Note:

PERFORMANCE SYSTEMS DEVELOPMENT

GSHP – Meaningful COPs

HXT024	Full Load	Future Model			
	Part Load				
HXT036	Full Load	28,500	4.1	38,900	18.2
	Part Load	22,000	4.8	29,000	28.4
HXT048	Full Load	42,500	4.0	53,500	17.7
	Part Load	33,500	4.7	42,400	25.2
HXT060	Full Load	50,000	3.8	65,500	17.6
	Part Load	39,500	4.3	48,600	23.5
HXT072	Full Load	60,000	3.9	70,000	15.6
	Part Load	50,000	4.3	56,500	20.3

Note:
Rated in accordance with ISO Standard 13256-1 which includes Pump Penalties.

GSHP – Pick the right water temp

Flow Rate		Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
		Cooling EWT 86°F		Heating EWT 66°F		Cooling EWT 59°F		Heating EWT 56°F		Cooling Brine Full Load 77°F Part Load 68°F		Heating Brine Full Load 32°F Part Load 41°F	
gpm	cfm	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
8	660	26,000	16.0	31,000	6.6	29,000	24.0	26,300	6.0	27,200	18.6	19,500	4.2
7	750	19,500	18.6	22,600	6.3	22,000	31.2	18,100	5.4	21,500	26.8	16,200	4.7
9	1900	39,000	17.2	42,200	6.6	39,400	24.1	34,800	6.0	40,200	20.1	27,000	4.2
8	1150	28,000	20.1	30,300	6.5	30,500	32.1	24,800	5.4	30,100	30.0	22,300	5.1
12	1400	48,300	15.6	57,400	5.1	53,200	22.7	47,200	4.7	50,000	18.0	37,400	4.1
11	1200	35,900	18.1	41,300	6.1	37,600	28.3	34,000	5.2	38,700	25.1	31,000	4.7
16	1800	64,500	16.2	72,500	6.1	70,700	22.7	66,800	4.6	67,600	18.0	45,800	3.8
14	1600	47,000	18.2	51,500	6.8	51,500	29.3	39,600	4.8	51,100	25.6	38,000	4.2
18	2000	71,000	15.0	86,700	6.0	79,900	20.4	67,900	4.4	73,600	16.8	54,100	3.8
18	1800	64,000	18.6	83,400	5.4	82,200	28.0	61,000	4.8	68,800	23.1	45,000	4.3
8	800	20,700	17.5	25,300	6.2	23,600	30.0	19,800	6.3	21,700	21.0	16,000	4.0
8	750	20,600	17.2	25,000	6.0	23,000	28.0	19,800	6.0	21,200	20.3	15,000	3.8
8	1000	28,300	19.2	32,700	6.8	31,300	28.8	26,800	6.0	28,400	21.9	20,000	4.0
8	900	28,100	19.2	32,700	6.6	30,900	27.1	25,800	4.9	29,200	21.1	19,800	3.8
9	1200	34,500	19.6	38,000	6.1	37,200	30.1	30,300	5.2	35,000	22.0	24,100	4.4
9	1200	34,100	17.5	37,800	5.6	35,300	25.7	30,300	4.7	34,600	19.6	24,100	4.0
11	1300	40,600	19.2	44,100	6.9	45,200	29.5	34,900	5.2	42,000	21.4	27,500	4.2
11	1300	40,100	18.6	44,100	6.3	44,600	26.5	34,900	4.8	41,800	18.6	27,500	3.7

17

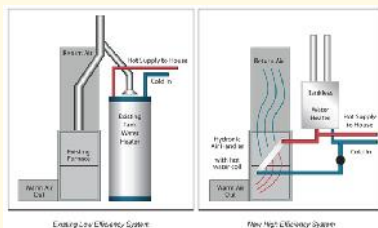
Integrated space/water heating systems

Defining Integrated Equipment Types

As of REM version 12.9, we recommend **NOT** using this library until it has been revised and updated.

The ASHRAE Standard on which it was based has been substantially changed, and the CAef and CAaia parameters on which the library depends are no longer available.

The REM library for these systems is no longer valid – based on an old ASHRAE standard



Integrated space/water heating systems

Mechanical Equipment Properties Summary

#	Type	Htg E _F	Clg E _F	Dhw E _F
1	A/C, 18K, 13 SEER20 ^{min}	0.80 (2.41 kW)		0.65 (2.41 kW)
2	A/C, 18K, 13 SEER20 ^{min}		1.0 (2.41 kW)	
3	A/C, 18K, 13 SEER20 ^{min}		1.0 (2.41 kW)	

Library Type: Integrated Space/Water Heating
Equipment: Gas Combo - Heating
Location: Conditioned area

Mechanical Equipment Properties Summary

#	Type	Htg E _F	Clg E _F	Dhw E _F
1	A/C, 18K, 13 SEER20 ^{min}		1.0 (2.41 kW)	
2	Gas Combo - Heating	0.80 (2.41 kW)		
3	Gas Combo - DHW			0.65 (2.41 kW)
4	A/C, 18K, 13 SEER20 ^{min}		1.0 (2.41 kW)	

Library Type: Water Heating
Equipment: Gas Combo - DHW
Location: Conditioned area

Integrated space/water heating systems - Example

- Takagi On Demand Water heating used for both DHW and Space Heating needs
- 1) Get performance information:
<http://www.ahridirectory.org/>
 - 2) Input Heating and DHW separately into REM using recovery efficiency as the AFUE

AHRI CERTIFIED™
www.ahridirectory.org

This water heater qualifies for Federal Energy Efficiency Tax Credit when placed in service between February 17, 2009 and December 31, 2013.

Certificate of Product Ratings

AHRI Certified Reference Number: 4397468 Date: 4/23/2013 †Status: Active

Product: Residential Water Heaters
Model Number: T-D2-IN-N
Manufacturer: A.O. SMITH WATER PRODUCTS CO.
Trade/Brand name: TAKAGI

Rated as follows in accordance with Department of Energy (DOE) Water Heater test procedures as published in the latest edition of the Code of Federal Regulations, 10 CFR Part 430 and subject to verification of rating accuracy by AHRI-sponsored, independent, third party testing:

Energy Factor:	0.82
Max GPM:	4.2 Gallons per minute

The following data is for reference only and is not certified by AHRI:

Energy Source:	Natural Gas
Water Heater Type:	Instantaneous
Rated Storage Volume:	0 Gals
Input:	199.0 MBtuh
Recovery Efficiency:	82 %
Heat Traps:	No

PERFORMANCE SYSTEMS
DEVELOPMENT

Name: Takagi OnDemand Heat ☐ Decorative

System Type: Fuel-fired hydronic distribu

Fuel Type: Natural gas

Rated Output Capacity (kBtuh): 199.0

Seasonal Equipment Efficiency: 85.0 AFUE

Auxiliary Electric Use: 0 Eee ☐ Use Default

Heat Pump - Auxiliary Inputs

Fan Power (Watts): 0 ☐ Use Default

Pump Energy: 0 Watts

Name: Takagi OnDemand DHW

Water Heater Type: Instant water heater

Fuel Type: Natural gas

Energy Factor: 0.85

Recovery Efficiency: 0.00

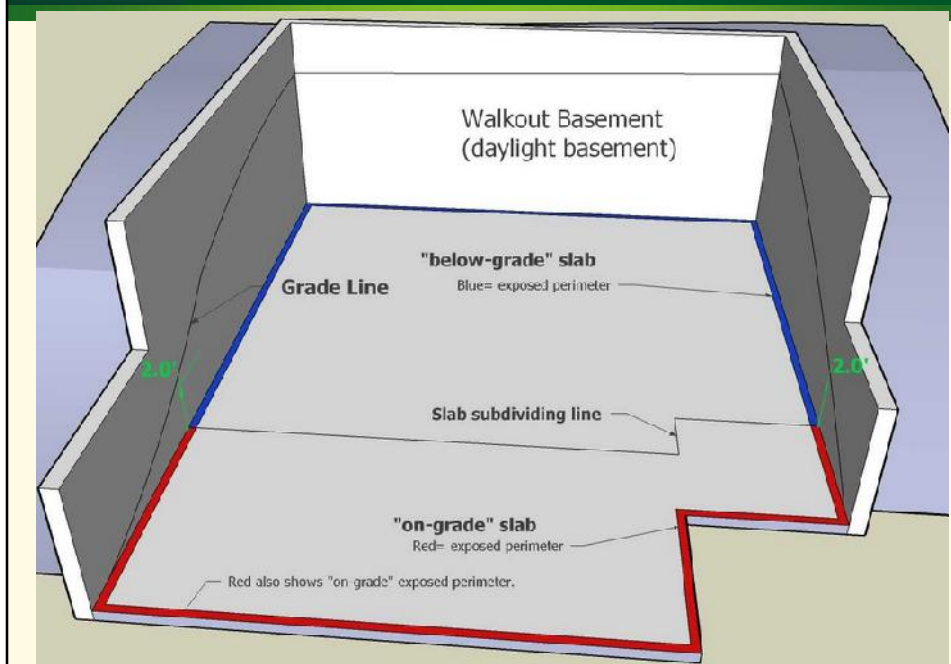
Water Tank Size (gallons): 0

Extra Tank Insulation (R-value): 0.0

Walk Out Basements

Foundation Walls -

- Split the wall into 3 inputs:
 - › one almost completely below grade
 - › one above grade
 - › one half way (or average depth of side walls)
 - › Additional sections for different construction, framed vs. concrete. (with option to put in above grade wall screen)



Slab Inputs

Full Perimeter (ft):	<input type="text" value="100.0"/>
Total Exposed Perimeter (ft):	<input type="text" value="100.0"/>
On-Grade Exposed Perimeter (ft):	<input type="text" value="25.0"/>

Full Perimeter –

- total of the length of all sides of the slab
- If the building shares a slab with a garage, include the boundary between the conditioned space and the garage

Total Exposed Perimeter – (does not mean exposed to air!)

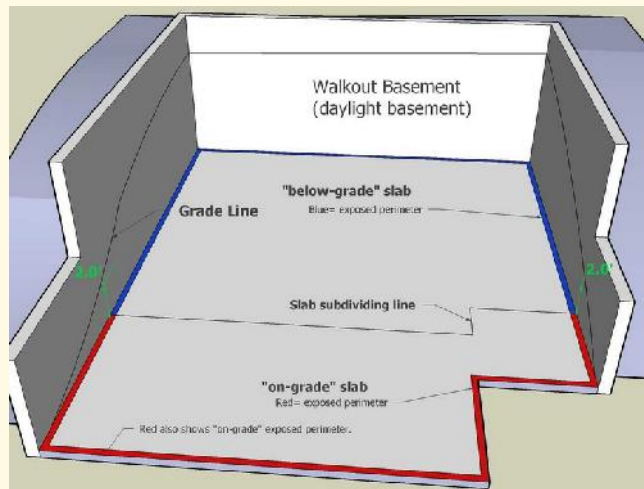
- full perimeter minus any perimeter that abuts conditioned space, another slab floor in conditioned space, or sub-floor buffer space.
- Exposed Perimeter will equal Full Perimeter if not adjacent to any conditioned or buffer space
- If the building shares a slab with a garage, include the boundary between the conditioned space and the garage in the Exposed Perimeter

On-Grade Exposed Perimeter

- the total length of slab edges **exposed to ambient air, earth, or an outdoor space** at grade or just below grade (2ft)

Walk out basements

Full Perimeter will always include the common perimeter where they touch each other, and the Exposed Perimeter will never include this shared line of contact.



Jumper Ducts

To test or not to test?

- Jumper ducts are not under pressure the way the remaining duct system is
- Leakage is certainly important – but not in the same way
- Jumper duct leakage is measured with the whole house leakage test

So – do not test

Jumper Ducts

To model or not to model?

- REM looks at all properties of the ductwork separately (insulation, leakage, surface area) so no issue with modeling the jumper ducts as additional ductwork to account for the surface properties. It will not mess up the leakage properties of the tested portion
- Attempting to model a jumper duct as a wall surface WILL mess up the model. There is no equivalent item in the reference home, and will mess up compliance and HERS index calculation

So – model along with the remaining ductwork

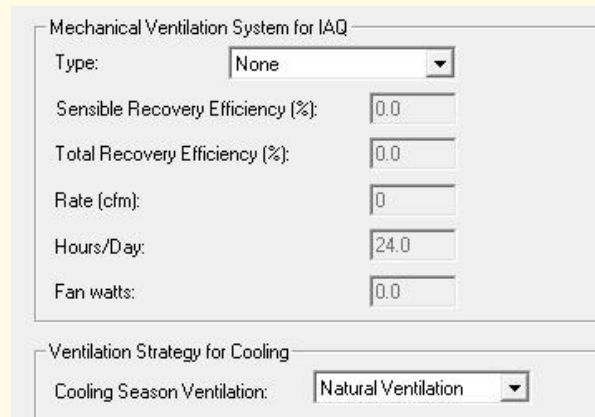


Duct Modeling

Things to remember:

- Location: Be sure it lines up with the rest of the model
 - › If you have ductwork in a crawl space, be sure you have a crawl space in your model
 - › Include all locations: ducts in garage ceiling, exposed ducts in the attic, in conditioned space
 - › If there is more than one system, be sure to model each one
 - › Default duct surface area is almost always fine

Modeling Air Flow



Mechanical Ventilation System for IAQ

Type:

Sensible Recovery Efficiency (%):

Total Recovery Efficiency (%):

Rate (cfm):

Hours/Day:

Fan watts:

Ventilation Strategy for Cooling

Cooling Season Ventilation:

Ventilation and Savings

Mechanical Ventilation System for IAQ

Type: **None**

Sensible Recovery Efficiency (%): 0.0

Total Recovery Efficiency (%): 0.0

Rate (cfm):

Hours/Day:

Fan watts:

HERS 65
23% savings over reference

Mechanical Ventilation System for IAQ

Type: **Exhaust Only**

Sensible Recovery Efficiency (%): 0.0

Total Recovery Efficiency (%): 0.0

Rate (cfm): 100

Hours/Day: 13.0

Fan watts: 21.0

HERS 62
27% savings over reference

Mechanical Ventilation System for IAQ

Type: **Balanced**

Sensible Recovery Efficiency (%): 66.0

Total Recovery Efficiency (%): 78.0

Rate (cfm): 65

Hours/Day: 16.0

Fan watts: 55.0

HERS 62
30% savings over reference

****Cannot claim savings for a structure tighter than the reference home without adding ventilation**

Attic Exterior

Ceiling Properties

Name: Ceiling

Type: R-50 Blown, Attic Item 020

Ceiling Area (sq ft): 1500

Attic Exterior (sq ft): 1500 [see Help](#)

- New input in version 13.0
- approximate area of all attic surfaces facing exterior conditions (roof deck *and* walls)
- **NOTE FROM REM:** “If you are modeling normal vented attics or closed cathedral vaults, setting this field to the same value as shown in Ceiling Area will generate results that match earlier versions of REM.
- For normal gabled roofs, this field is roughly equal to [ceiling area]*1.25, if you combine roof deck and the gabled ends”
- important if you are modeling Sealed Attics

Attic

- Flat or
- Vaulted:
- Closed space a
- Sealed:
- Attics v
- roof de
- insulati
- If the g
- than th

Ceiling Pitch	Area Multiplier
3/12	1.03
4/12	1.05
5/12	1.08
6/12	1.12
7/12	1.16
8/12	1.20
9/12	1.25
10/12	1.30
12/12	1.41

Thickness (in): 0.500
Framing Factor: 0.1100

ce above
g with no attic
lated at the
Assumes no
space
properties
g section

Tax Credit check - Batch Reports

- Check information on a large number of files quickly
- Run compliance Reports

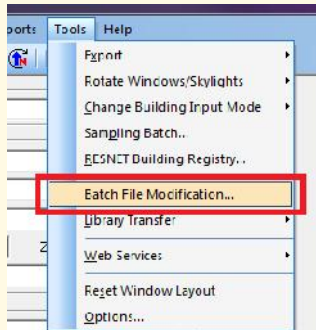
Tax Credit	Energy Star v2	Energy Star v2.5	Energy Star v3	HERS Index
No	Yes	Yes	Yes	61
No	Yes	Yes	Yes	58
No	Yes	Yes	Yes	61
No	Yes	Yes	Yes	60
No	Yes	Yes	Yes	60
No	Yes	Yes	Yes	64
Yes	Yes	Yes	Yes	55
No	Yes	Yes	Yes	55
No	Yes	Yes	Yes	56
No	Yes	Yes	Yes	63
No	Yes	Yes	Yes	56
No	Yes	Yes	Yes	89
No	Yes	Yes	Yes	62
No	Yes	Yes	Yes	67
No	Yes	Yes	Yes	59
No	Yes	Yes	Yes	61
No	Yes	Yes	Yes	62
No	Yes	Yes	Yes	61

Reports Tools Help

- Quick Analysis...
- View/Select Reports...
- Graph
- Logos...
- Improvement Analysis...
- New Home EEM Report...
- ESv2.0 Compliance and Improvement
- User Defined Reference Home...
- Rating Use Fee Statement...
- Print Permissions
- Printer Setup...
- Batch...

Batch File Modification

- Update a large number of files with identical information
- Provider ID number, updated plans, etc.



Simple QA Checks

Use the Quick Analysis, do the results make sense?

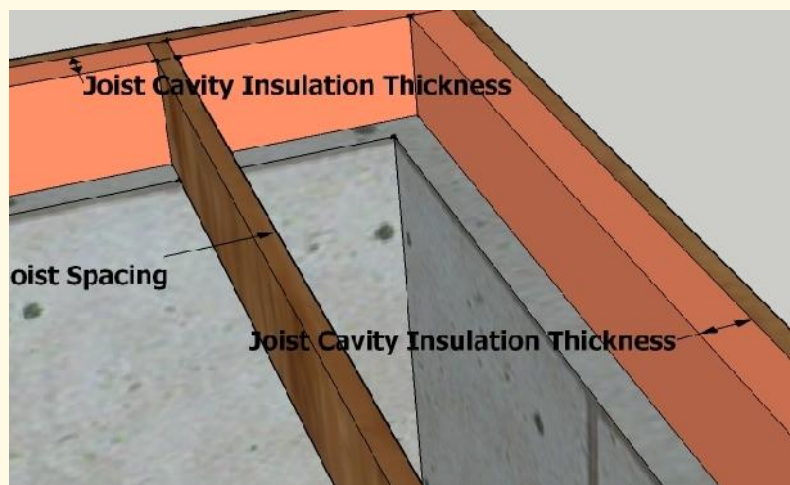
- Ceiling-to-floor ratio?
- Windows on all sides of the building?
- Window-to-wall ratio?
- Total Annual Energy Costs?
- Check Compliance

Analysis																											
Updated: 10:40:48 AM																											
<div> </div>																											
<div> <div>Total Area (sq ft)</div> <table> <tr><td>Conditioned Space</td><td>1792</td></tr> <tr><td>Shell Area</td><td>3851</td></tr> <tr><td>AG Shell Area</td><td>3170</td></tr> <tr><td>Foundation Walls</td><td>779.7</td></tr> <tr><td>Slab Floors</td><td>597</td></tr> <tr><td>Frame Floors</td><td>0</td></tr> <tr><td>Rim and Band Joist</td><td>197.4</td></tr> <tr><td>Above-Grade Walls</td><td>1678.0</td></tr> <tr><td>Windows</td><td>153.9</td></tr> <tr><td>Doors</td><td>55.4</td></tr> <tr><td>Ceilings</td><td>599</td></tr> <tr><td>Skylights</td><td>0.0</td></tr> <tr><td>Ducts</td><td>430.1</td></tr> </table> </div>		Conditioned Space	1792	Shell Area	3851	AG Shell Area	3170	Foundation Walls	779.7	Slab Floors	597	Frame Floors	0	Rim and Band Joist	197.4	Above-Grade Walls	1678.0	Windows	153.9	Doors	55.4	Ceilings	599	Skylights	0.0	Ducts	430.1
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Ceilings	599																										
Skylights	0.0																										
Ducts	430.1																										
<div> <div>Ratios</div> <table> <tr><td>Window-To-Wall</td><td>0.092</td></tr> <tr><td>Window-To-Floor</td><td>0.086</td></tr> </table> </div>		Window-To-Wall	0.092	Window-To-Floor	0.086																						
Window-To-Wall	0.092																										
Window-To-Floor	0.086																										
<div> <div>Window Area By Orientation (sq ft)</div> <table> <tr><td>North</td><td>62.0</td></tr> <tr><td>Northeast</td><td>0.0</td></tr> <tr><td>East</td><td>4.0</td></tr> <tr><td>Southeast</td><td>0.0</td></tr> <tr><td>South</td><td>55.5</td></tr> <tr><td>Southwest</td><td>0.0</td></tr> <tr><td>West</td><td>32.4</td></tr> <tr><td>Northwest</td><td>0.0</td></tr> </table> </div>		North	62.0	Northeast	0.0	East	4.0	Southeast	0.0	South	55.5	Southwest	0.0	West	32.4	Northwest	0.0										
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Keep in mind...

- Attic hatches
- Small framed floor sections
- Walls adj to attics, basement, garage (did you identify these in the model?)
- Window overhangs do matter
- Mechanicals and ductwork placement – does it agree with the rest of the model?
- Basement or attic stairwell in unconditioned spaces
- Update actual final rating information in the final model!
 - › Duct Location (in garage? attic?), appliance specs, orientation
- Rim/Band Joists – enter the frame cavity insulation, the software assumes the joists spacing appropriately.

Rim/Band Joist



Tips for Appliances

Rating Audit

Refrigerator
Total Consumption: 378 kWh/yr Location: Conditioned

Dishwasher
Energy Factor: 0.46 or kWh/yr: 0 Place Setting Capacity: 12

Range/Oven
Fuel: Electric Induction Range Convection Oven

- Dishwasher: Use one or the other (EF or kWh/yr)
- If there is NO dishwasher:
 - › EF – leave the default of 0.46
 - › kWh/yr – leave as '0'
 - › If the rated home lacks any of the appliances shown on the Rating tab, the HERS calculation (per RESNET) will force the house to have that appliance anyway. In this way it does not get penalized, or benefit from this item.

Refrigerators

Rating Audit

Refrigerator
Total Consumption: 378 kWh/yr Location: Conditioned

Dishwasher
Energy Factor: 0.46 or kWh/yr: 0 Place Setting Capacity: 12

- More than one refrigerator?
 - › Enter the combined consumption of all refrigerators and freezers for single family homes
 - › Enter the average of all units for multifamily if modeled as "Whole Building"

Washer

- Use presets only when you do not have information on the appliance

LER – labeled Energy Rating (kWh/yr)

MEF

- modified energy factor, found on the EnergyGuide Label or the CEC Appliance Database: <http://www.appliances.energy.ca.gov/>
- Indicates how wet the clothes are after the wash cycle which determines how much energy the dryer will use

Electric Rate, Gas Rate, Annual Gas Cost: **“Do not guess at any of these values; or the energy model will produce nonsense results.”**

Lighting

- Now divided into three categories: interior, exterior, garage
- Enter % of *qualifying light fixtures* in each location
- *qualifying light fixtures*:
 - › a) fluorescent hard-wired (i.e. pin-based) lamps with ballast;
 - › b) screw-in compact fluorescent bulb(s); or
 - › c) light fixture controlled by a photo cell and motion sensor.
- **DO NOT include:**
 - Plug in lamps, closet lighting, lighting in unfinished basements, and landscape lighting

Additional Help

- Sign up for REM Rate Discussion Group:
- <https://groups.google.com/forum/?fromgroup=s#!forum/remsupport>
- Use the Help Section in REM by selecting the “?” on a given page
- Ask your Provider



QUESTIONS?

