



























REM/*Rate* Advanced Training RESNET 2014

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February 23, 2014



INTRODUCTION

V. Robert Salcido

- Director of REM Programs
- Background in Environmental and Civil Engineering
- 20+ years experience in energy and building science

Brian Christensen

REM/

Rate

- Background in Physics and Mechanical Engineering
- 20+ years experience in solar energy and building science (including 8 years of HERS Ratings)

















- 1) Understand the new features in REM/Rate
- 2) What is going on behind the scenes at AEC
- 3) Understand what is coming with REM/Rate CLOUD
- 4) Training in REM/*Rate* advanced/unknown features
- 5) Understand what you want/need in software





6

OVERVIEW

- REM/Rate Installation
 - Installation
 - REM Files
- New Features
 - Adiabatic Floors and Ceilings
 - ENERGY STAR v3.0 Rev 7
 - eGRID 2012 emissions
 - LEED for Homes Report
 - RESNET Life Cycle Costing
 - Numerous unseen changes/fixes
- REM/Rate Cloud
 - Licensing
 - Operation
 - Features
 - Benefits
 - Cons
 - Current Desktop
- Printing/Data Output
 - Multi-Building Reporting
 - Report Grouping
 - Print Permissions
 - Logos
 - Data Export
- Libraries

REM/Rate

- File Opening
- Temporary Libraries
- Library Sets and Transfer

- Analysis
 - Existing Home Toolset
 - User Defined Reference Home
 - Batching
- Technical
 - Cond vs Uncond Foundations
 - Sealed Attics
 - Thermal Boundaries
 - Utility Rates
 - Integrated Systems
 - GSHP
- Tricks
 - Equation Solver
 - Tabs
 - Docking Panes
 - Reset Window Layout
 - Default Building
 - Window Rotation
 - Registration
- Options
 - Binding Adjustments
 - Home Energy Ratings
 - IECC
 - EPA / ENERGY STAR
 - Discussion
- 🗖 Q & A





7



TECHNICAL SUPPORT



TECHNICAL SUPPORT

Have you tried turning it off and on again?

Funny-Pictures-Blog.com





Two Installations

- Updater updates REM/Rate executable file but does not overwrite libraries or building files.
- Full Install if installed in an existing REM/Rate folder, then it will overwrite everything. Library transfer is possible from old versions to new, but not reverse.

Having multiple REM/Rate versions on your computer is possible.





SOFTWARE UPDATES







NEW FEATURES

Adiabatic floors and ceilings

- Adiabatic Floor is set as a location
- Adiabatic Ceiling is set as a type in library

ENERGY STAR v3.0 Rev 7

- Removed window/door exclusion from 2009 IECC UA Calculation
- Added a slab floor insulation exemption checkbox
- EPA Indoor airPLUS checklist no longer counted toward checklist requirements
- > Option for Total Duct Leakage for Rough-In added
- ENERGY STAR v3.1 coming out later this year (working with EPA now!)
- eGRID 2012 emissions
- LEED for Homes Report
- RESNET Life Cycle Costing
- Numerous unseen changes/fixes





11

NEW FEATURES

Enhancements in REM/Rate[™] v14.4.1 include:

General:

Corrected IECC Labels to show dominant ceiling type rather than listing each type. The IECC Certificate shows a listing of each type. Updated the Canadian version to remove printing restrictions for uploading to the RESNET Registry.

Bugs in v14.4 that were fixed in v14.4.1 include:

General:

Fixed the bug in the duct settings for the 2004 and 2006 IECC Design Building. This affected the Tax Credit calculations that are now fixed and getting the same results as past Tax Credit scores in REM/Rate v14.3.

Fixed a bug in the ENERGY STAR and DOE-Challenge Home UA Calculations. Now the reports show similar UA values to the 2009 and 2012 IECC UA Reports. Fixed a bug with the REM/Rate PNW Version with the Building Option Package (BOPs) Reference Homes due to incomplete heating and water heating settings. Fixed XML import bug where surfNum, wallNum, heatingEquipNumber, coolingEquipNumber fields were incorrectly set to the first item of the list.

Enhancements in REM/Rate[™] v14.4 include:

General:

Added the RESNET energy savings life cycle cost methodology.

Added the ability to model adiabatic ceilings for individual apartments under conditioned space. This allows the apartment shell area to be calculated correctly. Per EPA/ENERGY STAR request, added Slab Insulation exemption checkbox to the Mandatory Requirements screen.

Reports:

Added a LEED for Homes code and report.

Added ecoSelect HERS Index label for Southern Energy Management.

Added the Illinois 2012 Performance Report to the group that can show an unofficial report using mechanical equipment which meets the Federal Minimum efficiencies. Added the Texas Performance - North Central (NCTCOG) code report, which requires an access code provided by the North Central Texas Council of Governments.

Bugs in v14.3 that were fixed in v14.4 include:

General:

Corrected the U-value and SHGC check for NC codes. The NC code reports have been removed from REM's Old Reporting tool, and are only available in the New Reporting tool.

Corrected subtle bug in SHGC evaluation in UA Compliance reports; the 2009 & 2012 IECC set a maximum value for the area weighted average SHGC, while the other codes use the worst individual SHGC in the building instead of an average.

Corrected bug in internal gains for Multifamily whole-building models. Prior to the fix, increases in mechanical ventilation power caused a decrease in the annual consumption.

Corrected bug which checked insulation grade for adiabatic surfaces, which created problems for Multifamily ENERGY STAR ratings. Insulation grade is now ignored for adiabatic surfaces.

Corrected foundation insulation bug for ENERGY STAR, where exterior foundation insulation was adequate to allow grade 2 cavity insulation.

Adiabatic surfaces are no longer being listed as the dominant assembly type in reports with assembly summaries. Now, only assemblies which are part of the thermal envelope are included in the "dominant assembly" summaries.





REM WEB TOOL

- Licensing *
- Operation \checkmark
- ••• **Features**
- **Benefits** *
- * Cons
- **Current Desktop**





REM WEB TOOL – MODULAR LICENSING

Three Core Modules

- 1. REM Core (Energy Analysis)
- 2. REM Compliance (Code Compliance)
- 3. REM HERS (HERS Ratings)
- REM/Rate
- REM/Rate Light
- REM/Rate Research and Oversight
- REM/Rate Educational
- REM/Design
- REM/Design Light



Each license can be modified based on functionality desired

Export User Defined Reference Home Batch File Modification

Improvement Analysis Utility Bill Disaggregation Batch Operation



Improving building performance since 1982

REM WEB TOOL - OPERATION



REM WEB TOOL - OPERATION

pps 💡 LAMP Production 💡	LAMP Staging 💡 LAMP Develop	oment 💡 LAI	MP Local 📋	ColdFusion 📋 RemRate 🛔	🛓 c# - CQRS practio	cal 👌 c# - Order of items i 🐧	Z Catalo	g of Patterns 💡 Anonymous I	^o ro –	20
EM/Rate* Ame	My Libraries 👻							L bgianninoto@noresco	.com 👻	O Abou
Home / My Library Sets / I	REM Defaults									
Slab Floors 4	Slab Floors				New	Windows/Skylights (Placeh	older)			
Frame Floors	Name 🗘	Perimeter In	s. R-Value 🗘	Under Slab Ins. R-Value						Under
Foundation Walls	R-7 Perimeter	7.0		0.0	🖍 Edit 👻	Name	٥	Perimeter Ins. R-Value	٥	Slab Ins. R-Value
bove-Grade Walls	R-5 Perimeter	5.0		0,0	🖍 Edit 👻	R-7 Perimeter		7.0		0.0
bove-orace mails	R-7 Perimeter (Copy)	4.4		4.4	🖍 Edit 👻	R-5 Perimeter		5.0		0.0
Vindows/Skylights	Uninsulated	0.0		0.0	🖍 Edit 💌	R-7 Perimeter (Copy)		4.4		4.4
Doors					C	Сору		0.0		0.0
ceilings	Frame Floors (Placeho	lder)				Delete				
				Under	Doors (Placeholder)					
	Name	٥	Perimeter In	s. R-Value	Slab Ins. 🗘 R-Value					Under
	R-7 Perimeter		7.0		0.0	Name	٥	Perimeter Ins. R-Value	٥	R-Value
	R-5 Perimeter		5.0		0.0	R-7 Perimeter		7.0		0.0
	R-7 Perimeter (Copy)		4.4		4.4	R-5 Perimeter		5.0		0.0
	Uninsulated		0.0		0.0	R-7 Perimeter (Copy)		4.4		4.4
						Uninsulated		0.0		0.0
	Foundation Walls (Plac	ceholder)								
					Under	Ceilings (Placeholder)				
	Name	\$	Perimeter In	s. R-Value	Slab Ins. 🗘 R-Value					Under Slab Ins.
	R-7 Perimeter		7.0		0.0	Name	\$	Perimeter Ins. R-Value	\$	R-Value
	R-5 Perimeter		5.0		0.0	R-7 Perimeter		7.0		0.0
	R-7 Perimeter (Copy)		4.4		4.4	R-5 Perimeter		5.0		0.0
	Uninsulated		0.0		0.0	R-7 Perimeter (Copy)		4.4		4.4

REM/Rate

REM WEB TOOL - OPERATION







REM WEB TOOL – BENEFITS/FEATURES

- Ability to run REM/Rate on any browser
- No installations
- Quicker updates
 - Streamlined Input
 - Tracking changes to building model
 - Know building status
 - Ability to share and monitor building files
 - Online dashboard for better QA
 - Online license renewals and payments
 - Onboard counter for ratings and fees





18

REM WEB TOOL - CONS

- Only allow limited versions
- Will not operate without internet access
- May take some time to re-familiarize to new format





TEAMWORK



REM/*Rate*[™]





What can you do with today's REM?

(a survey of features that you might not know about, or have forgotten were there)





PRINTING/DATA OUTPUT

- Multi-Building Reporting demo
- Report Grouping demo
- Print Permissions demo
- Logos
- Data Export





PRINTING/DATA OUTPUT-LOGOS ON REPORTS

New Logos \rightarrow

Old Logos

REM/Rate

- Reports->Old Logos...
 - Select the radio button representing the position you want to add a logo.
 - If there is already a logo selected for that position, its filename will be highlighted and the image will be visible.
 - Logo bitmaps must be placed in the path shown at top.

Report Customization		X
Select images for a Logo and a HERS on your computer. Bitmap or jpgs are on the reports.	seal to appear on reports. Click the file br allowed. Use the Clear button to delete the	owse button and locate the image s file name, so nothing will appear
Logo: C:\REM\REM Code\Release	NBitmaps/remrate.jpg	🚰 🔀
Seal:		Clear
<u></u> K	Cancel	<u>H</u> elp

<none></none>	Bitmap:	/	
	View/Change		
	C Dista	C UEBCL	
	C Left	C HERC Logo	

Export to Database

- Access or SQL relational database
- All input, nearly all output
- Use for archiving, data mining (w/ queries)
- Reference homes can be exported
- Extensive documentation on Help menu





PRINTING/DATA OUTPUT – DATA EXPORTING

All the table types in the REM export:

You'll want someone with experience to write your queries!

Microsoft Acce	ess - [Electri	ic Savings by F	ind-Use Example	: Da	tabase (Acc	cess 97 fil	e format)]	
💼 File Edit Vi	ew <u>I</u> nsert	<u>T</u> ools <u>W</u> indow	<u>H</u> elp			Type a que:	stion for help	- 8 ×
🗈 😅 🖬 🖏	a 🔍 🖗	% 🖻 💼 ĸ	o + 📕 + 📾 +	1	00 8		2.	
🛱 Open 🕍 Design	n 🊈 New 🔷	× <u><u>a</u><u>a</u><u>a</u></u>						
Objects	🛄 ACCME	EAS 🛄	DOORTYPE		LAINST		SSWINDOW	
III Tables	🛄 ACTSO	DLAR 🛄	DUCT	Ⅲ	LIGHTAPP		SUNSPACE	
Queries	🛄 ADDMA	4SS 🛄	ECON	Ⅲ	PHOTOVOL		UTILRATE	
EB Forms	🛄 AGWAL	LL 🏢	EQINST	Ⅲ	PROJINFO		Version	
	III ASHPT'	YPE 🏢	EQUIP	ⅲ	REJMEAS		WALLTYPE	
🖺 Reports	🔠 BLDGIN	NFO 🛄	FLRTYPE		RESULTS	==	WINDOW	
🗎 Pages	💷 BLOCK		FNDWALL		ROOF		WNDWTYPE	
🗖 Macros	III BUILDI	NG 🏼	FNDWTYPE	Ⅲ	SEASNRAT			
A Modules	III BUILDR	RUN 🛄	FRAMEFLR	Ⅲ	SIMPINP			
•3• Modules	EILTY	'PE 📖	FUELSUM	Ⅲ	SITE			
Groups	CLGTYF	PE 📖	GSHPTYPE	Ⅲ	SKYLIGHT			
🛞 Favorites	III COMPT	INDE 🛄	HEATPATH	Ⅲ	SLAB			
	🛄 COSTR	ATE 🛄	HTDHTYPE		SLABTYPE			
	III DEHPT	YPE 🛄	HTGTYPE	Ⅲ	SSCMNWAL			
	🛄 DHWTY	YPE 🛄	INFILT	==	SSMASS			
	🛄 DOOR		JOIST	Ⅲ	SSSKLGHT			
Ready							NUM	



PRINTING/DATA OUTPUT – DATA EXPORTING

<u>CSV</u>

- "Comma separated values"
- Imports into Microsoft Excel
- Single building results
 - Same file name as building file, *.csv extension
 - Toggle on/off in Options menu
- Batch
 - Named Batch.csv
 - Always generated





TEAMWORK







LIBRARIES

- File Opening messages
- Temporary Libraries
- Library Sets and Transfer





LIBRARIES – FILE OPENING

- Messages when opening building files
 - Temporary library entries
 - Appends an * to name
 - Avoids changing building file and voiding print permissions
 - Adding to the library

REM/Rate

- Updating a building from the library
 - Using a manually selected entry
 - Or, the library version of a modified entry

Type Not In Library X The ceiling type "R-30, Attic" specified for Ceiling 1 is not in the library. Add the type to the library as temporary (automatically deleted on building close). Add the type to the library. Use a different type from the library. OK OK to All Cancel





Component	U-Value	State
R-15 - Stone	0.079	
test	0.017	
R-13****	0.085	
Finishd BRICKonBlk 2	0.122	
R40E Fin BRICKonBlck	0.022	
R40E 2x6 R19g1	0.017	
Uninsulated Stud*	0.270	tmp
Uninsulated Concrete****	0.662	tmp

Use of Temporary Library entries makes life easier (denoted with an "*" and "tmp")

LIBRARIES – FILE OPENING

- QAD's: Temp. library feature provides a way to spot new entries that need review
- Try not to save buildings with temporary libraries as this will save the asterisk and continue to add them





LIBRARIES – MOVING

Copying libraries, or Backing up

- Full Library Sets
 - Easiest way: copy the entire folder containing the Library Set.
 - Default name & location: C:\...\REM Rate 14\Libraries
 - □ If doing backup, archive it in a safe place

Library Subsets

- Use Transfer Files (Libraries Menu)
 - Select which entries to transfer/share





LIBRARIES – LIBRARY SETS

Library Set (Libraries Menu)

- You can have specialized library sets, such as:
 - □ Libraries required by a weatherization program
 - New construction libraries
 - Change sets when needed

Library Se	iet 🛛 🔀	
Current Fold	Ider: tural Energy Corporation\REM Rate 12\BKC REM Libraries\	r
	Open Set New Set Save Set As	
Se	end Set to Transfer File New Set from Transfer File	
Authoriz Lock: Name:	zed: Yes Enter Password This set is unlocked.	
Administ Actio	ons	
	OK Cancel <u>H</u> elp	







REM/Rate





ANALYSIS

- Existing Home Toolset
 - Utility Bill Disaggregation
 - Improvement Analysis
- User Defined Reference Home
- Batching





ANALYSIS – EXISTING HOMES

Existing Home Toolset Demonstration

Utility Bill Analysis

Including efforts to calibrate model of my own home

Component Consumption Graphic

□ To see what parts of house most need upgrade

Improvement Analysis

Economic optimization of improvements





ANALYSIS – USER DEFINED REFERENCE HOME

User-Defined Reference Home

- Create custom reference homes
- Local codes, utility program baseline
- Uses text file w/ scripting language
- Example provided w/ software: m92bstn.udr
- Start w/ copy of example, retain *.udr extension
- Extensive documentation in help system





ANALYSIS – BATCHING

Batching

- Building file modifications (File menu)
- Results (Reports menu)
- Batch report, includes ENERGY STAR, tax credit status
- Can generate UDRH and other reports
- Export database
- ENERGY STAR labels, mailing labels





TECHNICAL

- Conditioned vs Unconditioned Foundations
- Sealed Attics
- Thermal Boundaries
- Utility Rates
- Integrated Systems
- Ground Source Heat Pumps





TECHNICAL – COND VS UNCOND FOUNDATIONS

- Conditioned vs. Unconditioned Basements
 - Conditioned setpoint is maintained
 - Unconditioned temperature calculated based on connections to conditioned/ambient, gain from ducts, equipment; generally floats 5 - 10 degrees lower than setpoint.







TECHNICAL – SEALED ATTICS

Sealed Attics

- DON'T model as Vaulted Ceiling or include the volume in Conditioned Space.
- DO use the new Ceiling Type (Sealed Attic) in the Ceiling Input screen.
- DO pay attention to the total exposure area of the attic, not just the roof area. (Attic Exterior input)
 - Sealed attic gable end walls can be modeled in the Above Grade Walls screen.





Thermal Boundary

- For unconditioned basements and crawlspaces, REM will use insulation levels to determine where the thermal boundary is – frame floor or the foundation wall.
- REM does allow the user to choose the thermal boundary location.





TECHNICAL – UTILITY RATES

Utility rates

🔶 Seasonal

Block rates

Utility Name: RockyMtnPwr 3/1 Fuel Type: Electric 💌	11 kWh
Seasons	Rates for Selected Season Service Charge (\$/Month): 20.00
Start Through	Min Max Rate
JAN DEC	0 500 0.4770
	500 1000000 0.9520
Add Delete	Add Delete
Start Month: JAN 💌	Block Range: 0 to 500
End Month: DEC -	Rate (\$/kWh): 0.4770
<u>0</u> K	<u>C</u> ancel <u>H</u> elp





TECHNICAL – INTEGRATED SYSTEMS

Integrated space/water heating systems

Boiler w/ side arm tank

REM/Rate

- Two systems: space heating, water heating
- Use boiler AFUE for tank recovery efficiency
- □ Set tank EF = 0.75 * AFUE
- DHW tank serving space heating coils
 Two systems: space heating, water heating
 Use tank recovery efficiency for space AFUE
 Commercial water heater



TECHNICAL – GROUND SOURCE HEAT PUMPS

- GSHPs include the ground loop efficiency
 - To use REM Well screen for ground loop model, use entry from GSHP library

REM/Rate	e v 14.4.1 - ESv3.0_HighEffic_fakeRegID.blg
File Buil	lding View Extras Libraries Reports Tools Help
🗅 🖻 🖥	a 🔩 i 🖱 🏢 🔪 🗟 🔟 🕼 🕼 🗹 🕒 💡
	GSHP Well System
	GSHP Wells
	Well Type:
	Number of Wells: 8
	Well Depth: 200
	Loop Flow (gpm):

 To use vendor-calculated seasonal efficiencies, use entries from heating-only & cooling-only libraries
 Check the Help for these libraries re: GSHP modeling



 REM model has fixed assumptions regarding soil characteristics



TRICKS

- Equation Solver
- Tabs
- Docking Panes
- Reset Window Layout
- Default Building
- Window Rotation
- Registration







Keyboard shortcuts

- Equation solver in fields
 - All numeric inputs
- Using Tab key to speed entry
- Using <alt> key to access menus







Docking Panes

 Windows for Quick Analysis and Errors/Warnings use docking

Reset Window Layout

- If Notes or Spreadsheet is moved off the screen, or can't find Errors/Warnings or Analysis panes
- Brings back the default layout of REM/Rate
- Under the Tools Menu







Default building

- 🔶 On File menu
- Lets you save/use partially filled out building
 - □ Your company name, etc.







Rotate windows/skylights



- Determine worst-case orientation
 - HERS score, energy costs, design loads







Web Services

- Registration
 - ID/PW must be exact, use copy/paste
 - Need to re-register annually or semi-annually to advance expiration date
 - Your Provider's expiration date can limit yours until she/he renews
- Downloading print permissions
 Also done during registration





OPTIONS DIALOG

- Binding Adjustments
- Home Energy Ratings
- IECC
- EPA / ENERGY STAR



WeKnowMemes





Binding adjustments

- Only applies to the Old Reports tool
- Slides text over on printed reports to allow for

binding

Options				×
Sizing Factors Demand Adjustm	Custom settings for repo	orts.		
Reports	Set Binding Adjus	tments for Reports		
EPA HERC		Binding Adjustmer	nts For Reports	X
IECC Settings		binding najastinei		
Miscellaneous				
		-	<u> </u>	
	OK	X-Offset (inch): X-Offset (inch):	0.00	eset
		r onsec (men).		
		<u> 0</u> K	<u>C</u> ancel	<u>H</u> elp





OPTIONS DIALOG - HERC

Home energy rating certificate

- HERS provider address
 - Appears in lower right corner
- Criteria program check
 - Check if home meets energy codes imbedded in software
- Disable regional criteria screen
 - Add program/regional criteria, check manually
- Add signature line to report
 - For rater/provider to sign





OPTIONS DIALOG - IECC

IECC Toggles

- Standard Design SEER
 - Applies only to 2003 and prior codes
 - □ Set to SEER 10 or 13, shows on reports

IECC Equipment Efficiency

- Uses Federal minimum equipment efficiency for 2009 & 2012 IECC reference homes
- 2009 & 2012 IECC Performance Reports are unofficial when this checkbox is marked







OPTIONS DIALOG - EPA

ENERGY STAR certificate

- Include border on certificate
- Add rating score to certificate/label
- Checkbox to use EPA Label Paper with New Reports
- Adjust printing offset for label (New or Old Reports)
 - □ All other printing adjustments apply only to Old Reports !



Options	
Sizing Factors Demand Adjustm Reports EPA HERC IECC Settings Tax Credit Miscellaneous	Custom settings for the ENERGY STAR and Indoor Air Plus Certificates and/or Labels. ENERGY STAR Display Border on Certificate Display HERS Index on Certificate Display HERS Index Set Label Offsets Set Certificate Offsets Set Label Offsets
	OK Cancel Apply Help



Next Steps:

- REM/Rate Cloud Summer of 2014
- New engine possibilities
- RESNET ANSI Standard 301
- New features we have been drooling over
 - □ New GSHP Ground Loop Analytical Solution
 - □ Add mini-split heat pump routine/library
 - □ Remove Integrated HTG/DWH library
 - RESNET Chapter 8
 - □ What do you want/need?













57



