Multifamily Ratings – What is Needed in HERS Rating Software?

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RESNET PARTICIPATION

- Member, SDC 300
- Member, Multifamily Subcommittee of the SDC 300 Sampling Task Group Performance Testing Task Group
- Member, Sampling Task Group of the SDC 900
- Member, Multifamily Rater Specialization Task Force of the SDC 200

PRINCIPAL, PANDO ALLIANCE

- 99.9% of work is MF
- ENERGY STAR, IAP, ZERH, NGBS, LEED for Homes, EGC, PHIUS+, audits
- Credentials RESNET HERS Rater BPI Building Analyst BPI Envelope Professional NGBS Green Verifier LEED for Homes Green Rater PHIUS+ Rater



SDC = Standards Development Committee

Why Multifamily?



MF Market Demand HUD MIP Reduction Program

 Affordable Housing Funding Requirements

• Utility Rebates

2017 HERS Ratings



From an email from RESNET on 1/30/2018 "Breakdown of 2017 HERS Rated Homes by Type of Housing"

Multifamily Dwelling Units Rated in 2017 by Climate Zone



The Landscape of Multifamily Modeling



Residential/Low-Rise Standards

• RESNET Standards

Read "home" as "apartment home" By building? By dwelling unit? Building height limitations

- RESNET Multifamily Guidelines Fills in some of the blanks
- Output: HERS Index Score



HERS Modeling for Program Compliance

- Up to 3 story, low-rise multifamily ENERGY STAR, Zero Energy Ready Home Enterprise Green Communities LEED for Homes, performance NGBS, performance
- Up to 5 story, seeking ENERGY STAR
- Incentive programs
- NYSERDA low-rise MF new constr. prog.













Commercial/ Mid-Rise and High Rise Standards

• ASHRAE 90.1

Energy Standard for Buildings Except Low-Rise Residential Buildings Appendix G is the modeling guidance Mid-rise and high rise residential, commercial

 Output: % Above Baseline





ASHRAE 90.1 Modeling for Program Compliance

Certifications

ENERGY STAR Multifamily High Rise

Enterprise Green Communities

- LEED for Homes Mid-Rise, performance NGBS, performance
- Programs
 HUD MIP Reduction Program















Coming Soon...

- ANSI/RESNET/ICC 301-201(9) Homes → Dwelling Units Building height limitation removed
- EPA's One Multifamily Unified low-rise, mid-rise, and high rise program



A Deep Dive into Multifamily HERS Modeling



A Brief History of MF HERS Modeling



A Brief History of Software Design for MF HERS Modeling

RESNET Standards emphasize "home"

Language informs software design

Raters adapt software for multifamily projects

RESNET Standards expanding to "dwelling unit"

Software evolution?





What's it Really Like?



Multifamily Ratings - What is Needed in HERS Rating Software?

Photo courtsey of Crescent Communities.

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Improve the way people make and use energy.



Experience

- Working in industry for 12 years.
- Dedicated to multifamily for last 6 years.
- 90% new construction.
- Half of our company is dedicated to solar energy.
- We are a B Corp!



Credentials

- RESNET HERS Rater & QADD
- NGBS Green Master Verifier
- LEED for Homes
 International Green Rater
- WaterSense Inspector
- OSHA 10 Hour

Issues with rating software:



- MF is not one size fits all
- Shared amenities
- Shared renewable energy

RateWin	HAND OU
The selected Building was saved with version 14.6.4 of the software. Opening this building will update the building format, and if you save the updated Building it will overwrite the older version. For safety you may wish to first make a backup copy. Do you wish to update the Building?	
Yes No	

Improve the way people make and use energy

Issues with rating software:

- Sampling
- Reporting
- Calculating 'worst case'
- International developments







What can be done?



FREE

- Create more user interface to allocate shared systems to the building or the unit.
- Create a better tracking system in the registry for sample set ID's. Get building programs utilizing same sampling protocols. Focus rating software more on the development level and/or building level to streamline this process.



- Reporting can be much improved and customized for the end use. Energy monitoring and direct feedback loop is coming.
- Automate calculation of worst case unit type or building.
- Embrace international growth!







Contact:



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MULTIFAMILY RATINGS - WHAT IS NEEDED IN HERS RATING SOFTWARE?

V. ROBERT SALCIDO, P.E., LEED AP

SALCIDO SOLUTIONS

MEMBER OF SDC 300 CALCULATIONS SUBCOMMITTEE AND MULTIFAMILY SUBCOMMITTEES



RETIRED FIREFIGHTER



FIRE SERVICE MANTRA

"150 Years of Tradition, Unimpeded by Progress!!"



PURPOSE

Ekotrope initiative to explore issues that arise when rating multifamily units

- Where are Raters improvising?
- What strategies have been implemented to work around rating software limits?
- Are these limits causing issues with business?
- Can improvements be made to rating software?
- What are those improvements?





PROCESS

Define the two multifamily groups

- Advisory Group Help with overall structure and direction (10)
- Discussion Group Determine improvements to rating software (5)

Build a survey to gather information on multifamily rating issues Present survey to both multifamily groups

Compile the results

Meet with Discussion Group (monthly)

Detail features to improve rating software for multifamily projects



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SURVEY FEEDBACK

Issues Reported

Batch Modification - "Saving time; tedious to go through and make changes for each unit rather than a batch action."

Central Systems - "Complicated and hard to input. Takes lots of time."

Sampling - "Doing replication in database or spreadsheets improves cost and efficiency."

Sampling - "Takes time to enter individual SS IDs into individual units."

Sampling - "The admin cost of getting the tracking from the rater, reviewing it, and then creating the duplicates takes a lot of time."

Streamline Input - "Time wasted, need for better organization with MF buildings and units."



SURVEY FEEDBACK

Issues Reported - cont.

Streamline Input - Better organization and efficiency; It can be really hard to keep track of

- a) files created to determine the worst case unit types, but do not end up being worst case unit templates,
- b) worst case unit templates, and
- c) actual individual address ratings to be uploaded to the Registry.

Streamline Input - Ability to quickly batch a set of inputs into projects

Streamline Input - Do takeoffs to come up with model inputs/geometry

Reporting - Report MF buildings as separate dwelling units, only, would facilitate different types of performance analysis and reporting.

Reporting - Run reports on individual model types/units or batch reports that you still have to look through multiple reports to get what we we need



SURVEY RESPONSES

Priority	Issues/Needs from Multifamily Survey	Group
1	Sampled Set project creation and management	Batch Operation
2	Batch Modification (all building and testing inputs)	Batch Operation
3	Strategies for Central/Shared HVAC, Ventilation and Laundry Systems	Actions/Functions Missing
4	Grouping of MF units to one building for organization and linking (within application)	Unit Management
5	Reports organized for showing multiple projects gear toward MF	Reporting
6	Worst Case Unit Processing (How to make this efficient and easy to manage)	Batch Operation
7	Replicate similar dwellings quickly (sampled sets, quick analysis, worst case)	Batch Operation
8	Custom Reference Home (ability to define a reference home similar to UDRH)	Actions/Functions Missing
9	Inputs organized to quickly review by multiple units (QA and review)	Reporting
10	Pattern Analysis - a single report to show all unit types in MF building by results and type	Reporting
11	Whole building HERS Index	Unit Management
12	Mobile App for field Input, organization and modeling (RaterPro)	User Interface
13	Connect with field data collection software (RaterPro, Canvas, etc)	User Interface
14	Utility Bill Analysis for HUD projects	Batch Operation
15	Have links to AHRI, Help, RESNET and other information in application	Actions/Functions Missing
16	Import building from SKETCH-UP	Actions/Functions Missing
17	Ability to Model Steel Framed Walls	Actions/Functions Missing
18	Ability to Model Exterior Thermal Mass	Actions/Functions Missing

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SURVEY RESULTS

Requests for Rating Software

- 1. Cluster unit types into buildings or projects
- 2. Batch Modification
- 3. Worst Case Analysis
- 4. Assist with Sampling Plans
- 5. Report minimum rated features of unit types
- 6. Report showing community level results
- 7. Export simple data



MF FEATURES OVERVIEW

Building Input Structure

Batch Editing

Worst Case Analysis

Sampling and Unit Management

Reporting

Data Exporting



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Address Weather Data Rater, Provider and Builder Information Envelope Settings Window Settings Mechanical Settings Ducts DHW Infiltration and Ventilation Lights and Appliances Utility Rates Onsite Power Production Mandatory Requirements

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Unit Name Number of Units Number of Floors Floor Level (Top, Interior, Bottom) Area Volume Number of Bedrooms Unit Envelope Areas Unit Window Areas Mechanical (Override) Ducts (Override) DHW (Override) Infiltration and Ventilation (Override) Lights and Appliances (Override) MF Project

Unit Types

Buildings

Address Weather Data Rater, Provider and Builder Information Envelope Settings Window Settings Mechanical Settings Ducts DHW Infiltration and Ventilation Lights and Appliances Utility Rates Onsite Power Production Mandatory Requirements

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Unit Name Number of Units Number of Floors Floor Level (Top, Interior, Bottom) Area Volume Number of Bedrooms Unit Envelope Areas Unit Window Areas Mechanical (Override) Ducts (Override) DHW (Override) Lights and Appliances (Override) MF Project

Unit Types

Buildings

Address Weather Data Rater, Provider and Builder Information Envelope Settings Window Settings Mechanical Settings Ducts DHW Infiltration and Ventilation Lights and Appliances Utility Rates Onsite Power Production Mandatory Requirements

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Building Name Building Type Building Address Number of Floors Assign Unit Types Common Space Data



BATCH EDITING

Use Data Heirarchy to assist with Batch Editing

Batch edit based in MF Project structure (Economies of Scale)

- Enter data quickly for all units in a building
- Choose to modify a subset of unit types or all unit types





BATCH EDITING

Unit Level Editing Unit Name Number of Units Number of Floors Floor Level Area Volume Number of Bedrooms Envelope Dimensions Window Dimensions Mechanical (Override) Ducts (Override) DHW (Override) Infiltration and Ventilation (Override) Lights and Appliances (Override)



Buildings

Project Level Editing Address Weather Data Rater, Provider and Builder Information Envelope Window Mechanical Ducts DHW Infiltration and Ventilation Lights and Appliances Utility Rates Onsite Power Production Mandatory Requirements

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Building Name Building Type Building Address Number of Floors Assign Unit Types Common Spaces Info



WORST CASE ANALYSIS

Multifamily Project consists of various Unit Types assigned to Buildings Can quickly compile a Worst Case Analysis of all units Conduct Worst Case Analysis for Unit Type based on:

- HERS Index
- ENERGY STAR
- DOE ZERH
- Code Compliance
- Consumption





WORST CASE ANALYSIS

					MF Proje	ct Informat	tion					
Project Name:	The Flats at Sha				Organization:		Cross Architects					
Address:	13706 N. FM Ro	bad					Builder:		AMC Builde	rs		
City:	Manor			Zip Code:	78653		Rater:		Joe Rater			
Weather File:							Provider:		Bob Provide	er		
					Worst C	Case Analys	sis					
Unit Data			HERS	Based Com	pliance		IE	CC Complia	nce	Gree	en Certificat	ions
						LEED for						
		HERS	ENERGY	ENERGY		Homes						
Unit Type	CFA	Index	STAR v3.0	STAR v3.1	DOE ZERH	Points	IECC 2018	IECC 2015	IECC 2009			
A1	606	70	Yes	Yes	Yes	10	Yes	Yes	Yes			
A2	699	70	Yes	Yes	Yes	10	Yes	Yes	Yes			
A3	734	70	Yes	Yes	Yes	10	Yes	Yes	Yes			
A3 HC	734	70	Yes	Yes	Yes	10	Yes	Yes	Yes			
B1	898	65	Yes	Yes	Yes	10	Yes	Yes	Yes			
B1 PARTIAL	947	65	Yes	Yes	Yes	10	Yes	Yes	Yes			
B2	983	65	Yes	No	No	10	Yes	Yes	Yes			
B2 PARTIAL	1,015	65	Yes	Yes	Yes	10	Yes	Yes	Yes			
B2 - HC	983	65	Yes	Yes	Yes	10	Yes	Yes	Yes			
B3	1,074	65	Yes	Yes	Yes	10	Yes	Yes	Yes			
C1	1,193	78	Yes	Yes	Yes	10	Yes	Yes	Yes			
C1 HC	1,193	78	Yes	Yes	Yes	10	Yes	Yes	Yes			
E1	562	70	Yes	No	No	10	Yes	Yes	Yes			
E1 ALTERNATE	562	70	Yes	Yes	Yes	10	Yes	Yes	Yes			
E1 - HC	562	70	Yes	Yes	Yes	10	Yes	Yes	Yes			

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SAMPLING

Export a spreadsheet that creates a list of all units in the project

- Unit Data
- Duct blaster and blower door targets
- Tested values
- ERI

Help with managing the testing of units (by type or individual unit)





SAMPLING

	MF Project Information											
Project Name:	The Flats at Shadow Gle	nn		Organization:	Cross Architects							
Address:	13706 N. FM Road			Builder:	AMC Builders							
City:	Manor	Zip Code:	78653	Rater:	Joe Rater							
Weather File:				Provider:	Bob Provider							

	Unit Testing												
	Unit Data Targets							Т		Results			
			Total Duct	Leakage	Unit			Total Duct	Leakage	Unit			
			Leakage	to Outside	Infiltration	Ventilaton	Testing	Leakage	to Outside	Infiltration	Ventilaton	HERS	ENERGY
Units	Unit Type	CFA	(CFM50)	(CFM50)	(ACH50)	(CFM50)	Date	(CFM50)	(CFM50)	(ACH50)	(CFM50)	Index	STAR
101	A1	606	48	24	3	26						56	Yes
102	A2	699	56	28	3	28						56	Yes
103	A3	734	59	29	3	30						56	Yes
104	A3 HC	734	59	29	3	30						56	Yes
105	B1	898	72	36	3	42						56	Yes
106	B1 PARTIAL	947	76	38	3	43						56	Yes
107	B2	983	79	39	3	44						56	Yes
108	B2 PARTIAL	1,015	81	41	3	45						56	Yes
109	B2 - HC	983	79	39	3	44						56	Yes
110	B3	1,074	86	43	3	47						56	Yes
201	C1	1,193	95	48	3	58						56	Yes
202	C1 HC	1,193	95	48	3	58						56	Yes
203	E1	562	45	22	3	24						56	Yes
204	E1 ALTERNATE	562	45	22	3	24						56	Yes
205	E1 - HC	562	45	22	3	24						56	Yes
206	A1	606	48	24	3	26						56	Yes
207	A2	699	56	28	3	28						56	Yes
208	A3	734	59	29	3	30						56	Yes
209	A3 HC	734	59	29	3	30						56	Yes
210	B1	898	72	36	3	42						56	Yes
301	B1 PARTIAL	947	76	38	3	43						56	Yes
302	B2	983	79	39	3	44						56	Yes
303	B2 PARTIAL	1,015	81	41	3	45						56	Yes
304	B2 - HC	983	79	39	3	44						56	Yes
305	B3	1,074	86	43	3	47						56	Yes
306	C1	1,193	95	48	3	58						56	Yes
307	C1 HC	1,193	95	48	3	58						56	Yes
308	E1	562	45	22	3	24						56	Yes
309	E1 ALTERNATE	562	45	22	3	24						56	Yes
310	E1 - HC	562	45	22	3	24						56	Yes

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REPORTING

- Report the dominant component in Unit Type similar to energy code certificates
- Highlight differences between Unit Types
- Show HERS Index of each Unit Type as well as other compliance (ENERGY STAR, IECC, etc)
- Display Infiltration metric CFM50/sq ft of shell area
- Compliance report for selected compliance results (HERS, ENERGY STAR, LEED, IECC, etc) by Unit Type
- Create reports that assist builders with encourage energy efficient design
- Create reports that assist raters with compiling quick results on a Unit, Building or Project level



REPORTING

			MF Pro	oject Information	
Project Name:	The Flats at Shadow G	ilenn		Organization:	Cross Architects
Address:	13706 N. FM Road			Builder:	AMC Builders
City:	Manor	Zip Code:	78653	Rater:	Joe Rater
Weather File:				Provider:	Bob Provider

			MF Bu	ilding Info	rmation				
Nama	Address	Building Number		Number		Common			
Name	Address	Туре	of Units	of Floors	CFA	Area			
Building 1	13701 N. FM Road, Manor, TX	В	24	3	20,220	2,426			
Building 2	13702 N. FM Road, Manor, TX	С	24	3	19,236	2,308			
Building 3	13703 N. FM Road, Manor, TX	D	24	3	13,488	1,619			
Building 4	13704 N. FM Road, Manor, TX	С	24	3	19,236	2,308			
Building 5	13705 N. FM Road, Manor, TX	А	24	3	17,638	2,117			
Building 6	13706 N. FM Road, Manor, TX	E	16	3	15,284	1,834			
Building 7	13707 N. FM Road, Manor, TX	E	16	3	15,284	1,834			
Building 8	13708 N. FM Road, Manor, TX	А	24	3	17,638	2,117			
Building 9	13709 N. FM Road, Manor, TX	А	24	3	17,638	2,117			
Building 10	13710 N. FM Road, Manor, TX	В	24	3	20,220	2,426			
Totals			224		175,882	21,106			

Building Unit Breakdown													
Building Types			1	2	3	4	5	6	7	8	9	10	
Unit Types	CFA	BR	В	С	D	С	Α	E	E	Α	А	В	
A1	606	1					12			12	12		
A2	699	1	12	12		12						12	
A3	734	1		6		6	5	4	4	5	5		
A3 HC	734	1					1			1	1		
B1	898	2	6									6	
B1 PARTIAL	947	2						8	8				
B2	983	2					3			3	3		
B2 PARTIAL	1,015	2					2			2	2		
B2 - HC	983	2					1			1	1		
B3	1,074	2	6	6		6						6	
C1	1,193	3						3	3				
C1 HC	1,193	3						1	1				
E1	562	1			11								
E1 ALTERNATE	562	1			12								
E1 - HC	562	1			1								
Unit Totals	224		24	24	24	24	24	16	16	24	24	24	
Building Net SF Total	175,882		20,220	19,236	13,488	19,236	17,638	15,284	15,284	17,638	17,638	20,220	
Bedroom Counts	310		36	30	24	30	30	32	32	30	30	36	

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DATA EXPORTING

Create a simple data set that is available for export

- Diagnostics
- Post Processing
- Custom Reports
- Data export customizable





FUTURE POSSIBILITIES

Human Progress

Through Time

You are here

Import Building data from Sketch-Up

Import Window data from a spreadsheet

Import/Export data to/from Wrightsoft, WrightDraw

Ability to compare to ASHRAE90.1 2013 Appendix G

Full building modeling vs unit by unit modeling



NEXT STEPS

Identify the priorities and build a road map

Determine market value of initiatives presented

Work within the industry to further refine the necessary features

Begin development

If you build it - they will come!!!





QUESTIONS?







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