QA Genie – Carrot Mode

ENERGY STAR Stakeholders Meeting

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EnergyLogic

QA Genie Overview (Refresher)

What?

- A comprehensive back-end solution for RESNET file quality assurance
- Controlled by RESNET
- Built by EnergyLogic R&D
- Vetted by RESNET Advisory Panel

QA Genie Overview (Refresher)

How?

- QA Genie is installed on RESNET Registry servers downstream of the registry itself
- All files are checked for over 100 internal consistency checks
- All files are checked against the entire database of other ratings
- All files are checked against designated subsets of related files

QA Genie Overview (Refresher)

Who?

- All raters
- All RFI’s
- All rating companies
- All rating providers

QA Genie Overview (Refresher)

Why?

- Rating consistency is mission critical for RESNET
- Rating veracity is mission critical for RESNET
- Rating volume is far too great to expect Human Quality Assurance (HQA) alone to perform the job
- Random selection is a very poor methodology
- Computers are really good at this type of job – pattern recognition

QA Genie – Stick Mode (briefly)

Potential Fraud Detection

- QA Genie possesses sophisticated fraud detection methodologies
- These methodologies are complimentary and redundant
- Methodologies were vetted and in one case developed by the USMA(West Point) Operation Research Center and former IBM fraud detection experts

QA Genie – Stick Mode

Potential Fraud Detection

- Bottom line
  - Systematic cheating has become much more difficult
    - Who cares about this?
  - RESNET will catch those that decide to try it
  - The knowledge alone of what RESNET is now able to do is a powerful deterrent

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Helping *everyone* do better

- RESNET will have powerful tools to direct improvement
- Consistency can be dramatically improved
- RESNET Quality Agents might be the “delivery mechanism”
- RESNET Quality Agents can be far more effective and efficient
  - Check what needs checking not the rest

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EnergyLogic Experience

- Continuous use of QA Genie internal tool (much simplified) since mid-2015
- Continuous improvement in error rate
- Objective: ID issues, track performance, improve performance

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Types of errors that can be corrected

- Training
- Drift
- Miscommunication
- Staff consistency – internally which impacts external relations

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Rater Report

Reports

Back to Rater Reports

Rater XLFFWLL

Date Range:	to Update *Most recent rating:* 9/26/2016 2:40:35
Total Ratings:	1,266
Registration Type(s):	Confirmed Rating (1211 ratings) Sampled Rating (55 ratings)
Home Type(s):	Single-Family (1250 ratings) Duplex (10 ratings) Low-rise Multi-family (6 ratings)
Climate Zone(s):	3A - Warm - Humid (1266 ratings)
Software(s):	RemRate (1266 ratings)

Flags

Outlier:	2,948 (2.33 per rating)
Red:	154 (0.12 per rating)

Most Common Flags

Attic Area-to-Attic Exterior Ratio (81.60%)
Estimate Return Duct Surface Area (30.65%)
Window SHGC Value(s) (23.46%)
Ratings in One Day (21.48%)
Water Heater EF (14.45%)
Window Orientations (13.35%)
Ratio of Slab and Framed Floor Areas to Roof Area (12.56%)
Water Heater EF (12.24%)
Duct LTO Testing Repeat Values (8.77%)
No Ceiling Area Entered (5.69%)

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Rater Report

Reports

Back to Rater Reports

Rater WLYRJFW	
Date Range:	to Update ***Most recent rating:*** *9/23/2016 2:38:38*
Total Ratings:	2,190
Registration Type(s):	Confirmed Rating (2190 ratings)
Home Type(s):	Single-Family (2131 ratings) Duplex (59 ratings)
Climate Zone(s):	5A - Cool - Humid (2190 ratings)
Software(s):	RemRate (2190 ratings)

Flags	
Outlier:	17,833 (8.14 per rating)
Red:	3,069 (1.40 per rating)

Most Common Flags

No Window Overhang(s) (90.32%)
Mechanical Equipment Set to Default EAE (89.59%)
Estimate Return Duct Surface Area (88.86%)
Wall Framing Factor (87.35%)
Wall Framing Factor (87.35%)
Estimate Supply Duct Surface Area (80.41%)
Window SHGC Value(s) (79.91%)
Rater Location (65.39%)
Attic Area-to-Attic Exterior Ratio (62.92%)
Window Interior Shading (48.26%)

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		Name	Total Files	Average Outlier Score
Rater Number:	123456789	Rater 1	228	0.96

Date Range (mm/dd/yyyy):	
From:	01/01/2016
To:	12/31/2016

% SFD:	82.0%
% Attached:	18.0%
Climate Zone:	5

	Most Common Outlier Flags	Count
1	Duct leakage testing,	23
2	Ratio of slab and framed floor areas to roof area,	21
3	Blower door infiltration,	17
4	Attic area-to-attic exterior ratio,	15
5	No window overhang(s),	15
6	Window location(s),	12
7	Conditioned crawl without adiabatic framed floor,	11
8	Refrigerator kWh/yr,	10
9	Building volume,	8
10	Conventional NG WH EF,	7

Average Red-Flag Score		Most Common Red Flags	Count
0.11	1	Wall assembly calculated R-value,	6
	2	Furnace AFUE,	5
	3	Sealed attic ceiling area-to-attic exterior ratio,	4
	4	Window interior shading,	4
	5	Door-to-wall ratio,	4
	6	Window SHGC value(s),	1
	7	Door-to-floor ratio,	1
	8	Climate zone,	0
	9	Number of bedrooms,	0
	10	Window-to-wall ratio,	0

	2015Q1	2015Q2	2015Q3	2015Q4	2016Q1	2016Q2	2016Q3	QAG Outlier Flag Trend
All EL Ratings	**1.29**	**1.34**	**1.34**	**1.52**	**1.17**	**1.24**	**1.34**	
Alicia Fields	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	1.59	1.11	
Bob Jenkins	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	0.71	1.74	
Chris Mitchell	0.71	0.92	0.89	0.62	0.44	*N/A*	*N/A*	
Christian Medina	1.17	1.44	1.56	1.39	1.63	1.34	1.34	
Derrick Luna	1.41	0.97	1.17	1.27	1.00	0.77	1.71	
Dexter Marsh	1.13	1.27	1.45	1.33	1.06	1.06	1.15	
Diane Boyd	1.03	1.35	1.25	0.90	1.47	1.94	1.15	
Dolores Wade	*N/A*	*N/A*	*N/A*	*N/A*	2.18	1.60	3.00	
Dwight Barber	*N/A*	*N/A*	0.33	1.40	2.25	1.00	3.67	
Edna Hampton	1.50	2.00	2.50	1.00	1.00	*N/A*	*N/A*	
Felix Wise	1.69	1.56	1.36	1.13	0.91	1.11	1.46	
Herbert Fisher	*N/A*	*N/A*	*N/A*	2.00	1.00	1.00	2.00	
Jack Simon	1.52	1.84	1.52	3.28	1.10	1.08	1.11	
Lorenzo Lindsey	0.95	0.64	0.93	1.03	0.75	0.93	1.10	
Marcos Flores	*N/A*	*N/A*	*N/A*	*N/A*	0.33	0.73	0.67	
Michael Richards	1.09	0.83	0.95	1.30	1.32	1.76	1.86	
Mike Walsh	1.24	1.12	1.42	1.18	0.92	1.02	0.94	
Myra Mckinney	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	1.06	1.20	
Owen Cortez	1.23	1.19	0.75	0.67	1.34	*N/A*	*N/A*	
Peter Arnold	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	1.16	1.00	
Rene Swanson	1.45	1.45	2.00	1.33	1.48	1.11	*N/A*	
Sheila Logan	1.93	2.55	1.34	1.98	1.31	1.85	1.93	
Willis Mccarthy	1.50	1.79	1.68	1.88	*N/A*	*N/A*	*N/A*	
Wilma Dean	1.43	1.12	1.72	1.25	1.22	1.02	1.19	

QA Genie – Carrot Mode

Flag	Q4 2014 Count	Q4 2014 Portion Flagged	Q4 2015 Count	Q4 2015 Portion Flagged	Improvement YoY
Vaulted, flat or adiabatic ceiling area DOES NOT = attic exterior	131	**14.74%**	108	**7.44%**	49.49%
SUM slab area + SUM framed floor area </= 1 sq ft + SUM roof area	129	**14.51%**	179	**12.34%**	14.98%
(Ducts outside thermal envelope OR framed floor area>250sqft) AND (leakage exemption OR LTO<10)	92	**10.35%**	165	**11.37%**	-9.88%
Return duct surface area DOES NOT equal ASHRAE 152 calculation	88	**9.90%**	97	**6.69%**	32.47%
Supply duct surface area DOES NOT equal ASHRAE 152 calculation	85	**9.56%**	89	**6.13%**	35.85%
Cond. Crawl w/ NO adiabatic FF area	71	**7.99%**	62	**4.27%**	46.50%
Cond. Basement w/ SOG	25	**2.81%**	10	**0.69%**	75.49%
Cond. sq ft - 50 > (SUM slab area + SUM framed floor area) * no. stories on/above grade (Walkout/Slab-on-grade)	20	**2.25%**	25	**1.72%**	23.41%
Interior shading not default	16	**1.80%**	38	**2.62%**	-45.51%
Supply ventilation w/ <200 watts	5	**0.56%**	2	**0.14%**	75.49%
Walkout slab full perimeter = exposed perimeter OR on-grade exposed perimeter	4	**0.45%**	0	**0.00%**	100.00%

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	2015Q1	2015Q2	2015Q3	2015Q4	2016Q1	2016Q2	2016Q3	Trend
Outlier Score	**1.29**	**1.34**	**1.34**	**1.52**	**1.17**	**1.24**	**1.34**	
Outlier								**Trend** (note differing axes)
File missing rater name OR number OR wrong rater number	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	
>5 Ratings by one rater in one day	0.8%	2.4%	5.1%	2.2%	2.5%	5.3%	0.0%	
odd rater location (org. state vs home state)	0.8%	0.8%	1.0%	1.3%	1.4%	0.8%	2.7%	
Address climate zone DOES NOT = selected climate zone	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	
Address climate zone > selected climate zone	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	
Bldg sq ft <500 or >6,000	1.3%	0.8%	1.1%	1.3%	1.1%	1.4%	2.1%	
Bldg vol <5,000 or >60,000	2.6%	2.3%	1.7%	2.3%	1.6%	1.9%	1.8%	
Bldg vol-to-sqft ratio >14 or <7	0.3%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	
No. bedrooms >5 or <1	1.3%	1.7%	1.0%	1.3%	1.3%	2.0%	1.5%	
SF & No. bedrooms <2	0.1%	0.2%	0.1%	0.0%	0.0%	0.1%	0.0%	
SUM slab area + SUM framed floor area </= 1 sq ft + SUM roof area	17.1%	16.4%	16.0%	12.0%	10.7%	10.0%	14.1%	
Sealed attic ceiling area = attic exterior OR Sealed attic ceiling area*1.41 < attic exterior	1.3%	1.0%	1.0%	1.4%	2.3%	1.5%	1.6%	
Sealed attic ceiling area = attic exterior	1.3%	1.0%	1.0%	1.4%	2.3%	1.5%	1.6%	
Vaulted, flat or adiabatic ceiling area DOES NOT = attic exterior	15.6%	19.7%	8.8%	7.0%	5.3%	4.8%	5.8%	
(Ducts outside thermal envelope OR framed floor area>250sqft) AND (leakage exemption OR LTO<10)	13.6%	19.2%	13.5%	11.9%	7.0%	12.0%	12.3%	

QA Genie – Carrot Mode

Summary

- A powerful tool in RESNET's drive to improve
  - Quality Assurance
    - Consistency
    - Veracity
    - Accuracy
    - Quality Agent effectiveness and efficiency
- A tool for quality minded organizations to improve their own performance

EnergyLogic R&D

- QA Genie
- QA Genie Lite (In Development)
- Housing Tides Market Research Report

Questions and Comments

Thank you!

Scott Doyle

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