How to Effectively Calculate Utility Allowances

Sharla Riead, Accurate Rater Network

Mike Harsma, SDHDA

What are the two largest expenditures for anyone who lives in a home?

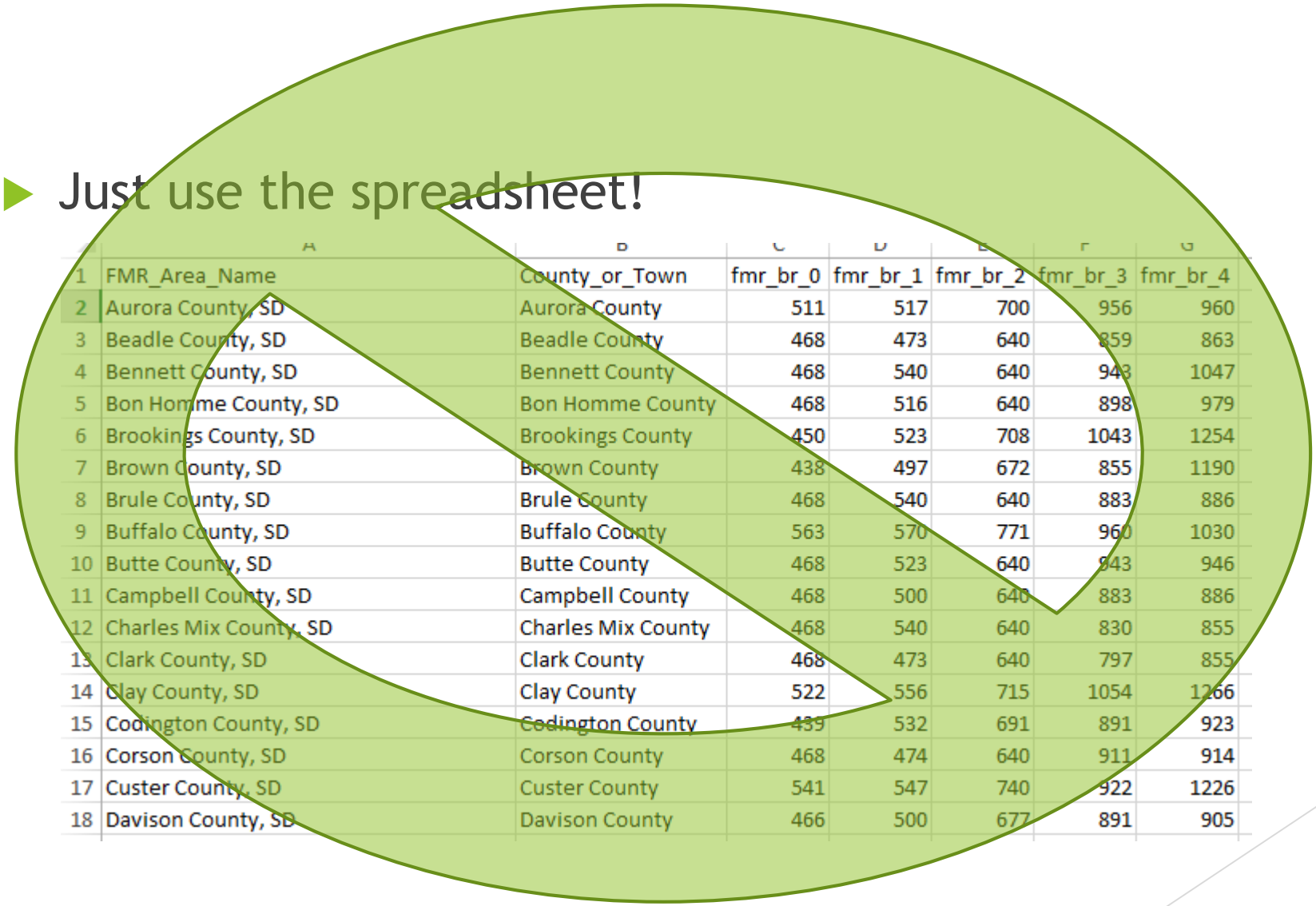
- Payment for the living space (Mortgage or Rent payment)
- Taxes? Insurance? Transportation?
- Energy! Cost of utilities used in the living space.
- US Households spend approximately $230 Billion annually on energy … NOT including transportation
- Energy costs make up approximately 15% of the household budget
- Any home that does not use energy wisely is NOT an affordable home – no matter what the rent or mortgage

Today's Presentation

- Utility Allowance Calculations – What is changing and why?
- WIIFM? Why you should care about how the calculation is completed and what is in it for you!
- Residential Energy Modeling as a calculation tool
- HERS Raters as part of your team
- SDHDA use of the calculations

Utility Allowance Calculations

- Just use the spreadsheet!



	A	B	C	D	E	F	G
1	FMR_Area_Name	County_or_Town	fmr_br_0	fmr_br_1	fmr_br_2	fmr_br_3	fmr_br_4
2	Aurora County, SD	Aurora County	511	517	700	956	960
3	Beadle County, SD	Beadle County	468	473	640	859	863
4	Bennett County, SD	Bennett County	468	540	640	943	1047
5	Bon Homme County, SD	Bon Homme County	468	516	640	898	979
6	Brookings County, SD	Brookings County	450	523	708	1043	1254
7	Brown County, SD	Brown County	438	497	672	855	1190
8	Brule County, SD	Brule County	468	540	640	883	886
9	Buffalo County, SD	Buffalo County	563	570	771	960	1030
10	Butte County, SD	Butte County	468	523	640	943	946
11	Campbell County, SD	Campbell County	468	500	640	883	886
12	Charles Mix County, SD	Charles Mix County	468	540	640	830	855
13	Clark County, SD	Clark County	468	473	640	797	855
14	Clay County, SD	Clay County	522	556	715	1054	1266
15	Codington County, SD	Codington County	439	532	691	891	923
16	Corson County, SD	Corson County	468	474	640	911	914
17	Custer County, SD	Custer County	541	547	740	922	1226
18	Davison County, SD	Davison County	466	500	677	891	905

Utility Allowance Calculations

- Two methods for calculation
  - Engineering-Based Methodology
    - Heat Loss Calculations
    - Heating Degree Days for the Region
    - Heating System efficiency
    - Water Heating Efficiency
    - Lights, appliances, A/C, etc.
  - Consumption-Based Methodology
    - Three-Year Rolling Base

Utility Allowance Calculations

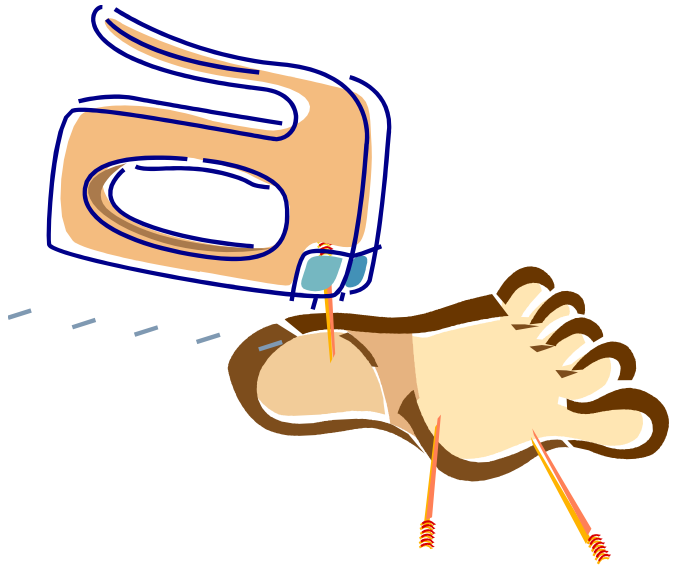
- Engineering-Based Methodology
  - Btus per fuel unit
  - Indoor temperature
  - Outdoor Design Temperatures in Winter
  - Include distribution system efficiencies
  - Multiply wattage of each light bulb by the number of hours the bulb will be turned on
  - Include the wattage of air conditioners and how often they are used
- Home Energy Raters do this in their sleep!

Why the change?

- Changes in building practices and building codes
  - End of the 1% to 3% improvements
  - 15% to 30% to 50%
- Improvements in Energy Efficiency of buildings
  - Trends toward zero energy building
- HUD Template is outdated and inaccurate

WIIFM?

- Spreadsheet was easy, but…



- Let’s make some comparisons

1500 SF 3 BR Home on Basement here in Hughes County

- Spreadsheet Utility Allowance: $986.00
- Engineered Utility Allowance: $726.00

- Allowable Rent Charge = 60% AMI
  - Utility Costs must be included in this charge
  - Every dollar decrease in utility allowance equals a dollar increase allowed in rent fee
  - That is money in your pocket! $260.00, $21.67/month, every month, year after year.

WIIFM?

- Financial Analysis – dollars invested in Energy Efficiency vs. Savings account, money market fund, CDs?
  - National Avg: 0.07%
  - Best Rate: 0.78%
- You are building efficiently already! Get credit for it!
- However:
  - $2,500.00 Investment = 10.4%
  - $5,000.00 Investment = 5.2%
  - $30,000.00 Investment = 0.87%

WIIFM?

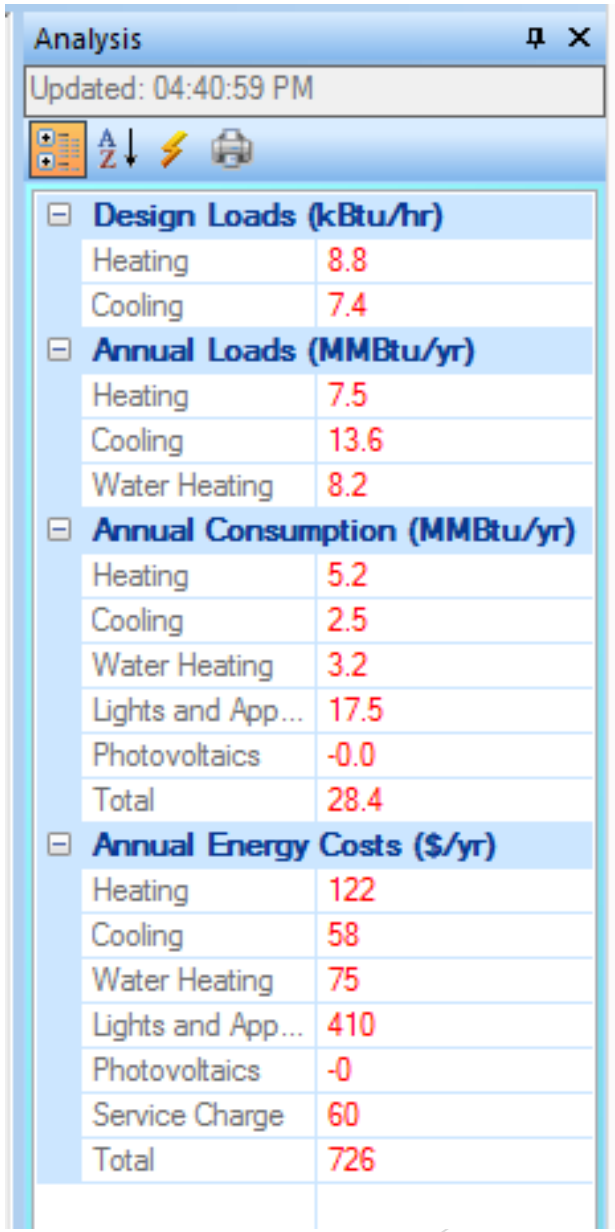
- Energy Retrofits as part of your portfolio?
  - Study completed in CZ4
    - Average deep retrofit cost: $16,000 (min: $2,400, max: $38,000)
    - Average energy savings: 50% - 70%
    - Average Simple Payback Period: 0 to 15 years
    - Retrofits were designed to pay back from day 1, cost of improvements paid by energy savings with extra cash back of $20 - $50 per month!

WIIFM?

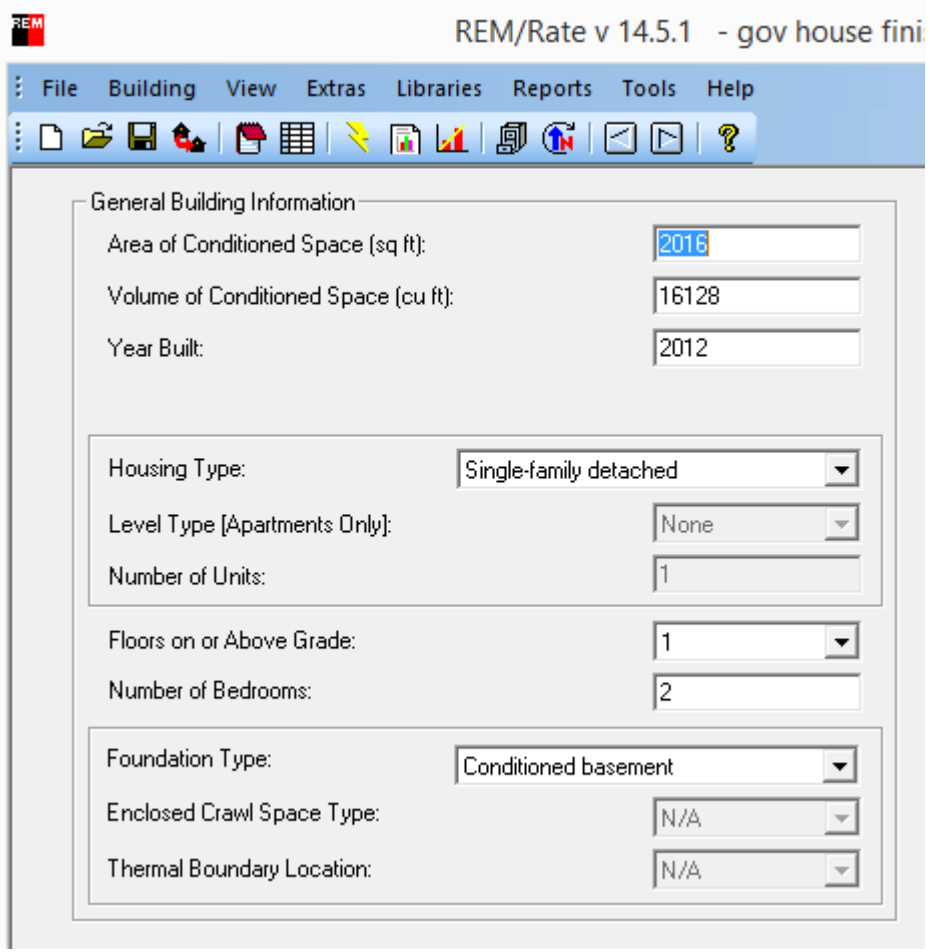
- What about the renter?
  - More Comfortable
  - Cleaner Indoor Air, less dust, less pollution
  - Quieter
  - Affordable
- Less Turn-Over?

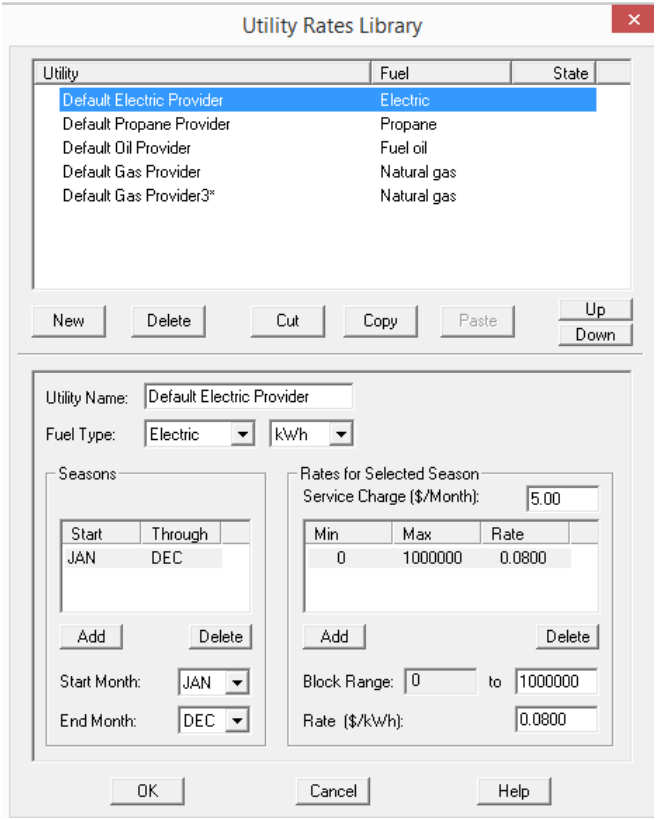
Energy Modeling

- REM/Rate: Residential Energy Modeling for HERS Rating
- REM/Design: Same energy usage calculations – no HERS Index

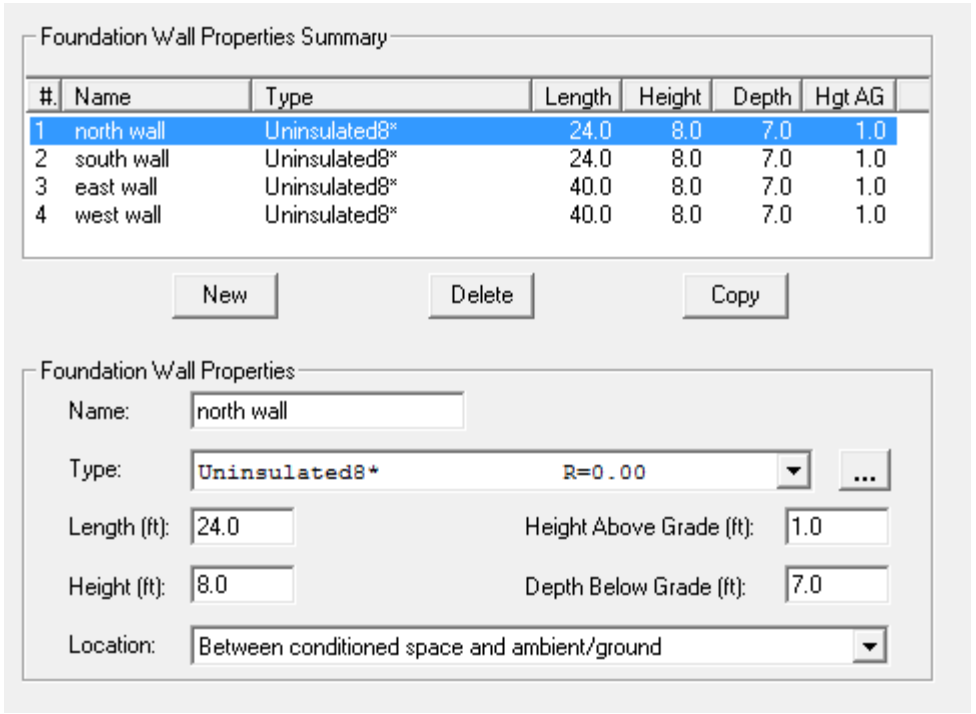


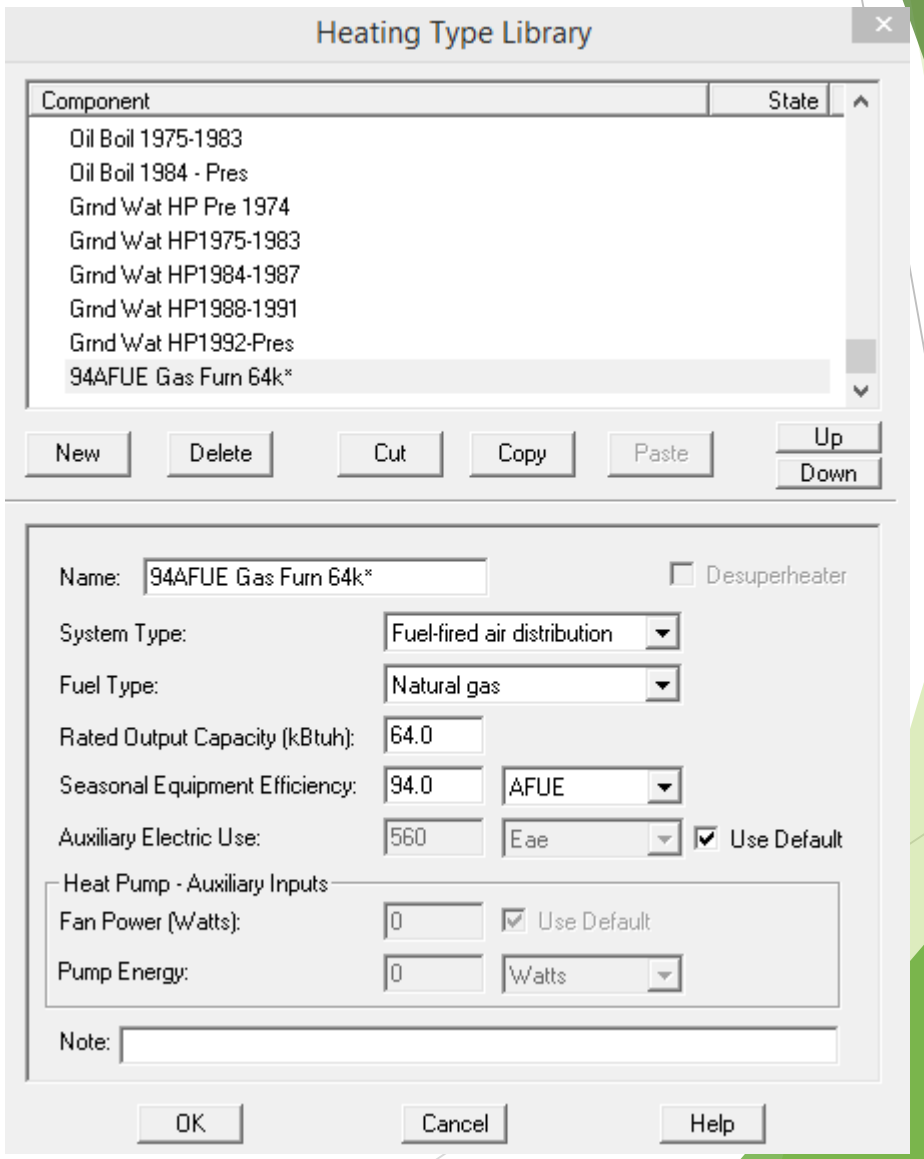
General House Characteristics



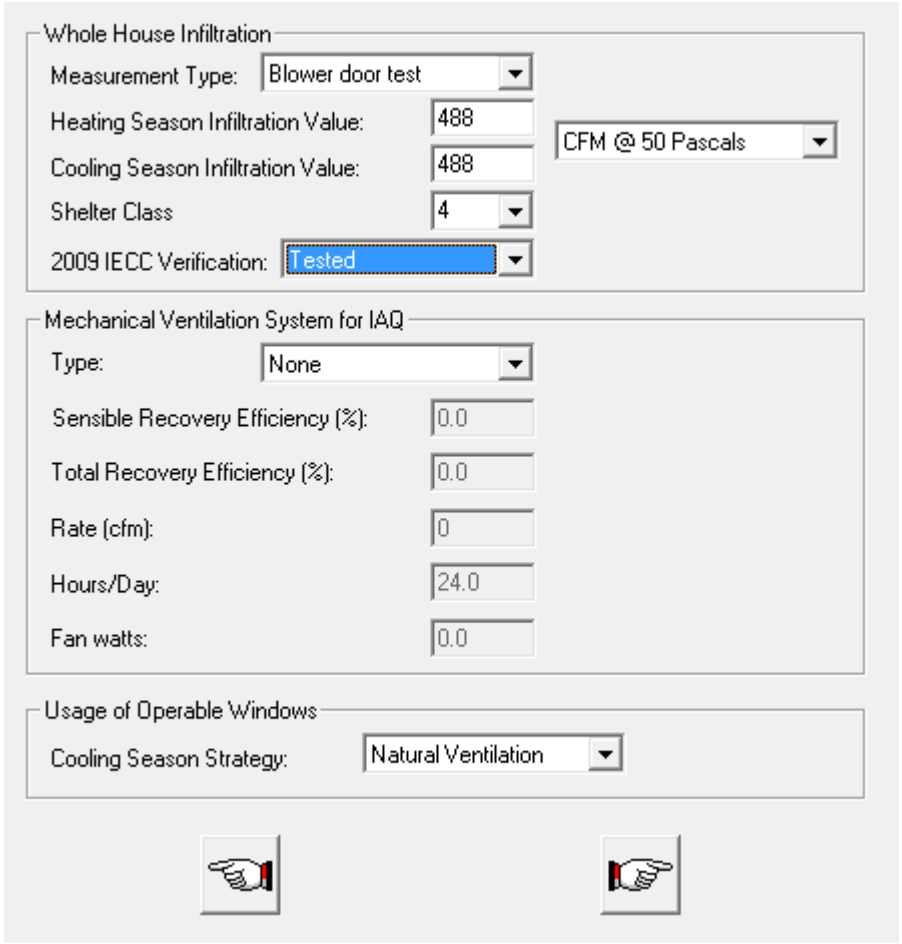


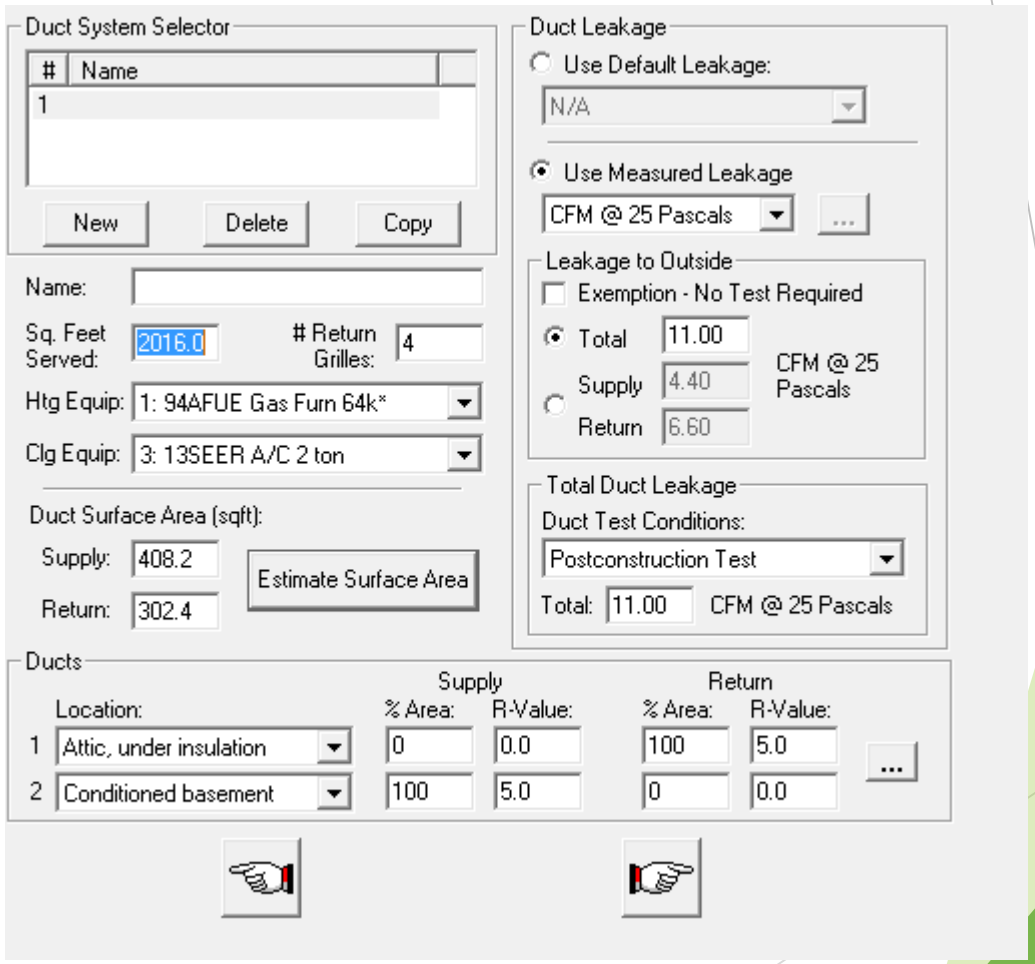
Modeling of Building Components



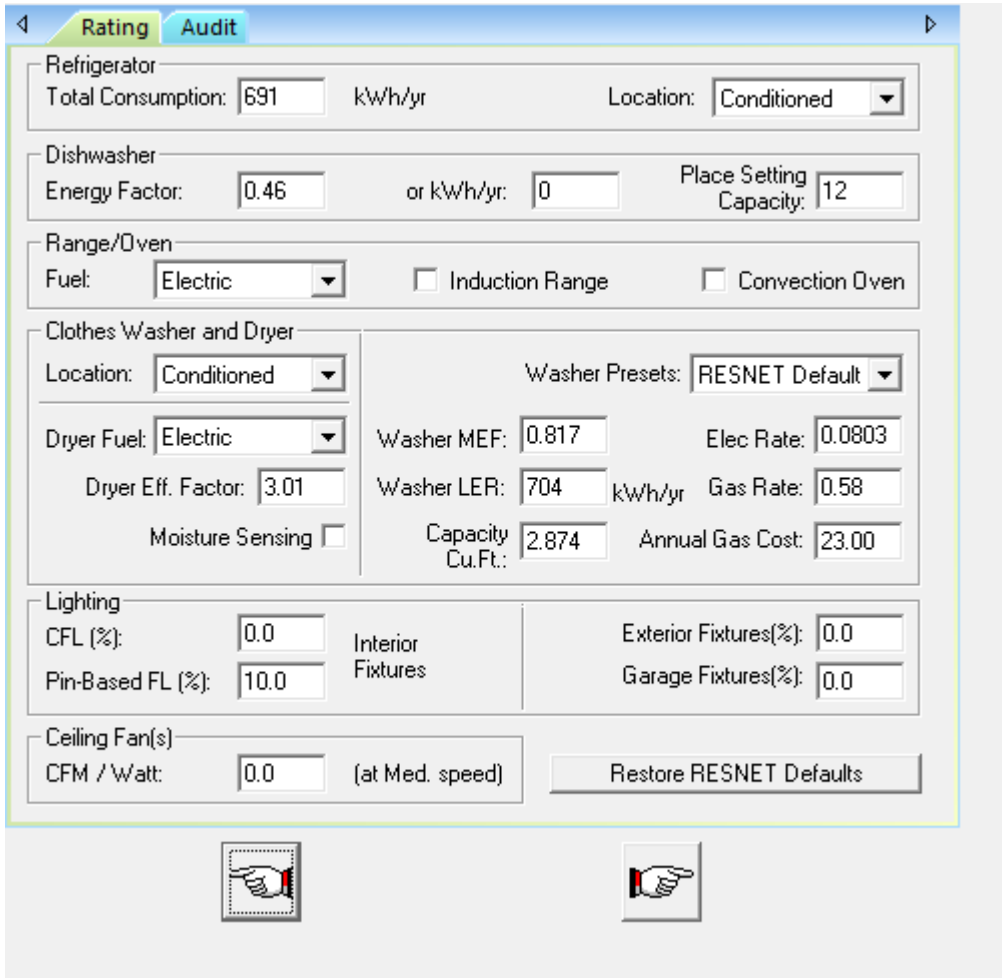


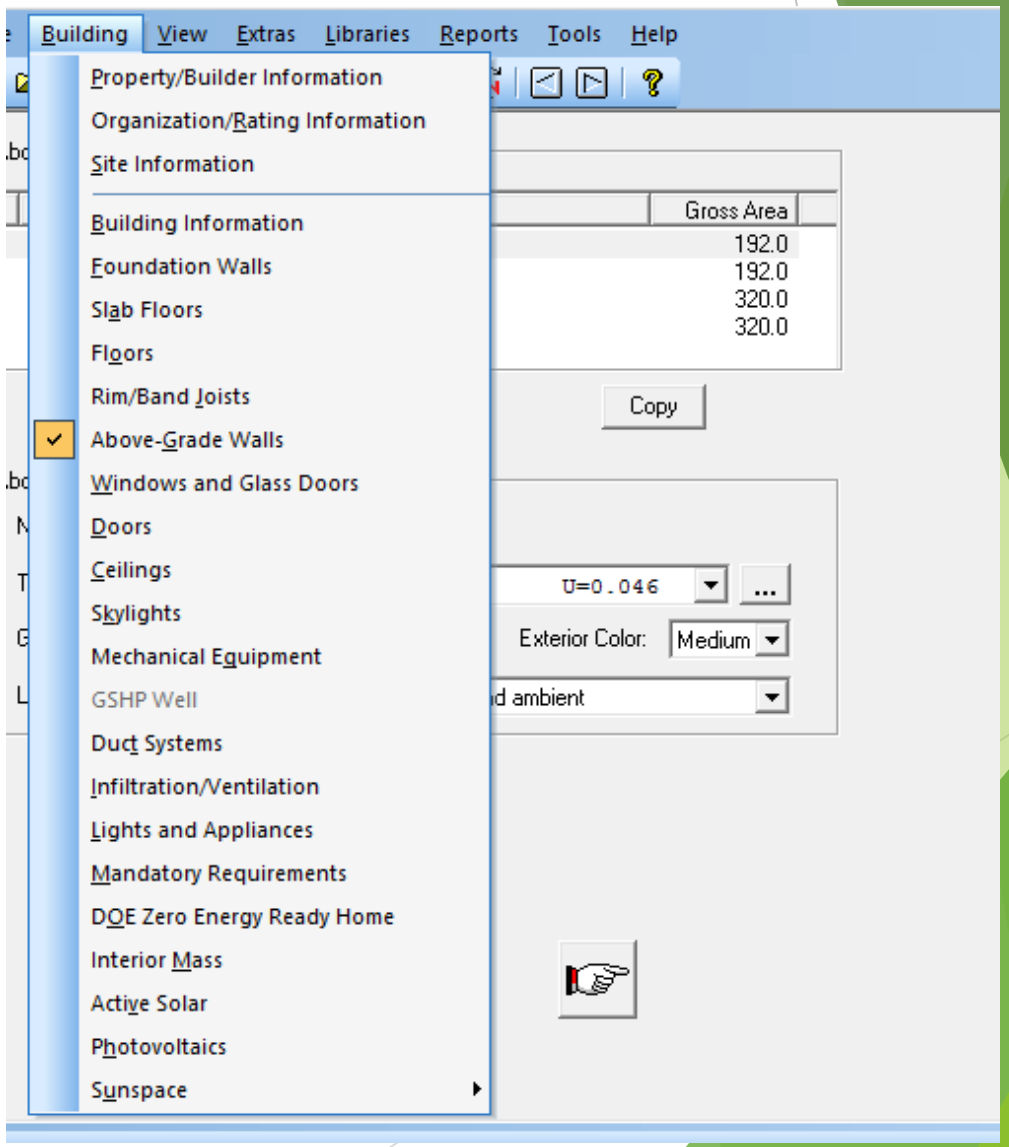
Infiltration & Duct Leakage





Lights and Appliances & Everything Else!





Reports and Information

Energy Cost and Features

Property	Organization	HERS
SDHDA mitchell, SD 57501 Weather:Huron, SD Gov's House PassivHaus gov house passive.blg	SDHDA 605-390-4009 mike harsma Builder SDHDA	Rater ID:probabtionary

Annual Energy Costs	$/yr
Heating	122
Cooling	58
Water Heating	75
Lights & Appliances	410
Photovoltaics	-0
Service Charges	60
Total	726
Average Monthly($/Month)	60

Energy Features	
Ceiling w/Attic	passive U=0.007
Sealed Attic	None
Vaulted Ceiling	None
Above Grade Wall	passive* U=0.014
Foundation Walls (Cond)	ICF R=39.8
Foundation Walls (Uncond)	None
Doors	Steel-polyurethane U=0.283
Windows	Alpen U=0.140
Floors	None
Slab Floors	THIS HOUSE 0 U=0.014
Infiltration	Htg: 28 Clg: 28 CFM50
Infiltration Measure	Blower door test
Mechanical Ventilation	Balanced: ERV, 45 cfm, 15.0 watts.
Interior Mass	None
Mechanical Equipment 1	ASHP: Htg: 30.7 kBtuh, 10.6 HSPF. Clg: 12.0 kBtuh, 23.0 SEER, with Desuperheater.
Mechanical Equipment 2	Water Heating: Heat pump, Elec, 2.34 EF.
Programmable Thermostat	Heat=Yes; Cool=Yes
Ducts	R-72.8Conditioned space
Duct Leakage to Outside	RESNET/HERS default
Total Duct Leakage	Not Applicable
Lights/Appliances	Defaults
Active Solar	None

Note: Where feature level varies in home, the dominate value is shown.

Equipment Sizing

Property	Organization	HERS
SDHDA mitchell, SD 57501 Weather:Huron, SD Gov's House PassivHaus gov house passive.blg	SDHDA 605-390-4009 mike harsma Builder SDHDA	Rater ID:probabtionary

Heating

Calculated Peak Load (kBtu/hr)	8.8
Infiltration	0.1
Envelope	8.7
Sizing Factor (%)	100.0
Heating Equipment Capacity(kBtu/hr)	
Required	8.8
Specified	30.7

Cooling

Calculated Peak Load (kBtu/hr)	7.4
Sensible	6.4
Latent	0.9
SHF	0.9
Sizing Factor(%)	100.0
Cooling Equipment Capacity (kBtu/hr)	
Required Total	7.4
Specified Total	12.0
Specified SHF	0.7
Required Sensible	6.44
Specified Sensible	8.40
Required Latent	0.94
Specified Latent	3.60

Fuel Summary

Property	Organization	HERS
SDHDA mitchell, SD 57501 Weather:Huron, SD Gov's House PassivHaus gov house passive.blg	SDHDA 605-390-4009 mike harsma Builder SDHDA	Rater ID:probabtionary

Annual Energy Cost	$/yr
Electric	666

Annual End-Use Cost	$/yr
Heating	122
Cooling	58
Water Heating	75
Lights & Appliances	410
Photovoltaics	-0
Service Charge	60
Total	726

Annual End-Use Consumption	
Heating (kWh)	1531
Cooling (kWh)	723
Water Heating (kWh)	940
Lights & Appliances (kWh)	5131
Total (kWh)	8326

Annual Energy Demands	kW
Heating	2.3
Cooling	0.4
Water Heating (Winter Peak)	0.2
Water Heating (Summer Peak)	0.1
Lights & Appliances (Winter Peak)	0.4
Lights & Appliances (Summer Peak)	1.0
Total Winter Peak	2.9
Total Summer Peak	1.5

Utility Rates	
Electricity	Default Electric Provider

Reports and Information

Lights and Appliances

Property
SDHDA
mitchell, SD 57501

Weather:Huron, SD
Gov's House PassivHaus
gov house passive.blg

Organization
SDHDA
605-390-4009
mike harsma

Builder
SDHDA

HERS
Rater ID:probabtionary

Electric Consumption	kWh/yr
Interior Lighting	860.7
Exterior Lighting	50.2
Garage Lighting	100.0
Refrigerator	673.0
Freezer	0.0
Dishwasher	139.8
Oven/Range	409.0
Clothes Washer	62.8
Clothes Dryer	318.7
Mechanical Ventilation Fan	131.4
Ceiling Fan	0.0
Plug Loads	2385.6
Total	5131.2

Annual Energy Cost	$/yr
Interior Lighting	69
Exterior Lighting	4
Garage Lighting	8
Refrigerator	54
Freezer	0
Dishwasher	11
Oven/Range	33
Clothes Washer	5
Clothes Dryer	25
Mechanical Ventilation Fan	11
Ceiling Fan	0
Plug Loads	191
Total	410

Performance Report

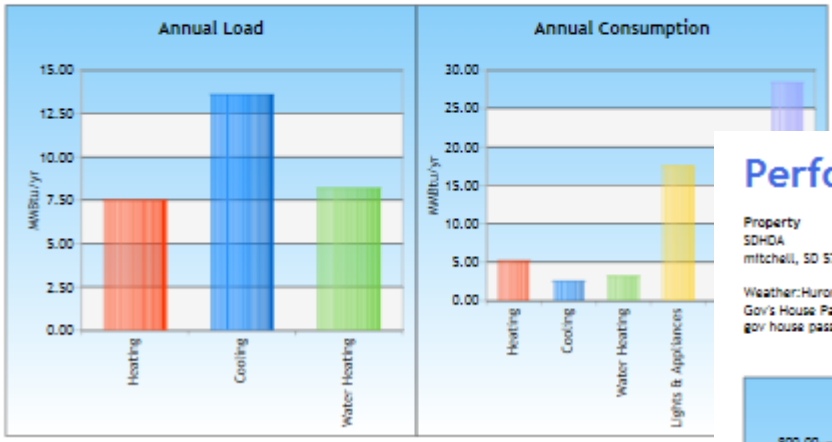
Property
SDHDA
mitchell, SD 57501

Weather:Huron, SD
Gov's House PassivHaus
gov house passive.blg

Organization
SDHDA
605-390-4009
mike harsma

Builder
SDHDA

HERS
Rater ID:probabtionary



Performance Report

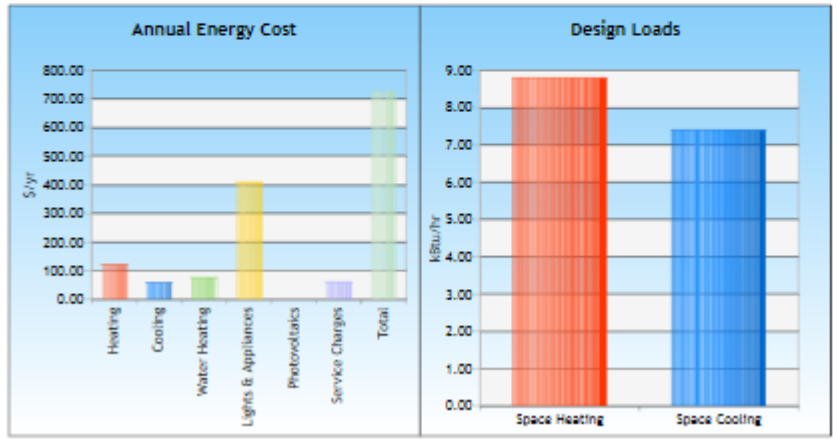
Property
SDHDA
mitchell, SD 57501

Weather:Huron, SD
Gov's House PassivHaus
gov house passive.blg

Organization
SDHDA
605-390-4009
mike harsma

Builder
SDHDA

HERS
Rater ID:probabtionary



The HERS Rater

- Preliminary Analysis – Model Energy Usage from Plans
  - Can model trade-offs to determine cost effectiveness
  - Can provide heads-up on potential energy, health, safety, and building durability issues
  - Can help ensure your bid request documents are clear – set expectations for trades and sub-contractors

The HERS Rater

- Pre-Drywall Inspection
  - Ensure thermal bypasses are sealed
  - Grade the Insulation job
  - Your quality assurance partner during construction using National Inspection Protocols
  - Accepted as IECC inspection compliance (if approved by local code officials)
  - Minimize surprises while there is still time to fix issues

The HERS Rater

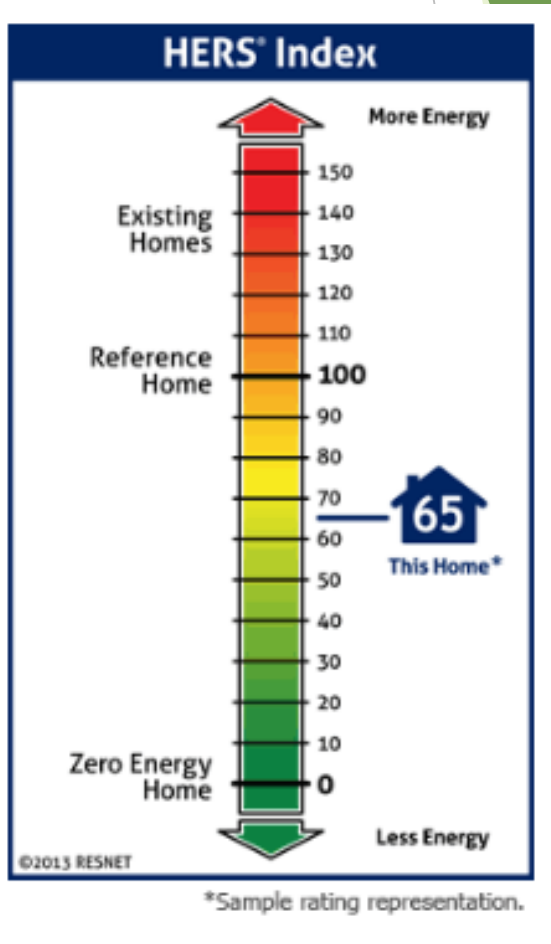
- Final Testing and Inspection
  - When equipment is set, doorknobs are on, lighting and appliances are in
  - Infiltration tests with Blower Door
  - Duct Leakage testing
  - Attic insulation inspection
  - HVAC Equipment, appliances, lighting, fans, etc. verification
  - HERS Index Certification – Nationally accepted measure of energy efficiency

Your HERS Rater

- Consult and advise to expedite your transition and adoption of new, more stringent, codes
- Assist understanding of new technologies and applications related to building performance
- Set expectations and provide QA of sub-contractor groups
- Partner to manage construction costs while improving energy performance
- Provide an edge in Marketing and Sales

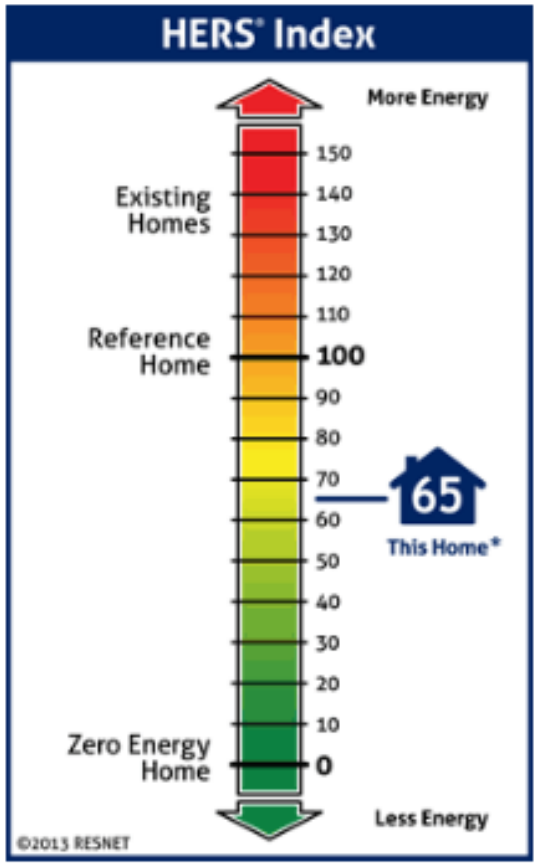
Marketing & Sales

- **Confidence**
  - **Deliver on energy and quality performance goals**
- **Assurance**
  - **For the Home Buyer**
- **Manage**
  - **Fewer punch list issues for new homeowners**



*Sample rating representation.

Your HERS Rater



*Sample rating representation.

RESNET®
RESIDENTIAL ENERGY SERVICES NETWORK

RESNET®
EnergySmart Builder

Every Home is a HERS Rated Home

RESNET®
ENERGYSMART CONTRACTOR

SDHDA Use of the Calculations

- Mike Harsma