

# **Whole Energy Analysis of a Home**

## **RESNET's New Expanded Score Method**

2006 RESNET Conference



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# Analysis Approach

- **REM/Rate<sup>TM</sup> home energy rating software**
- **Four climates: Chicago, Miami, Baltimore, San Diego**
- **2000 sf home**
- **100 and 85 point homes (HERS Index)**

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# Analysis Approach

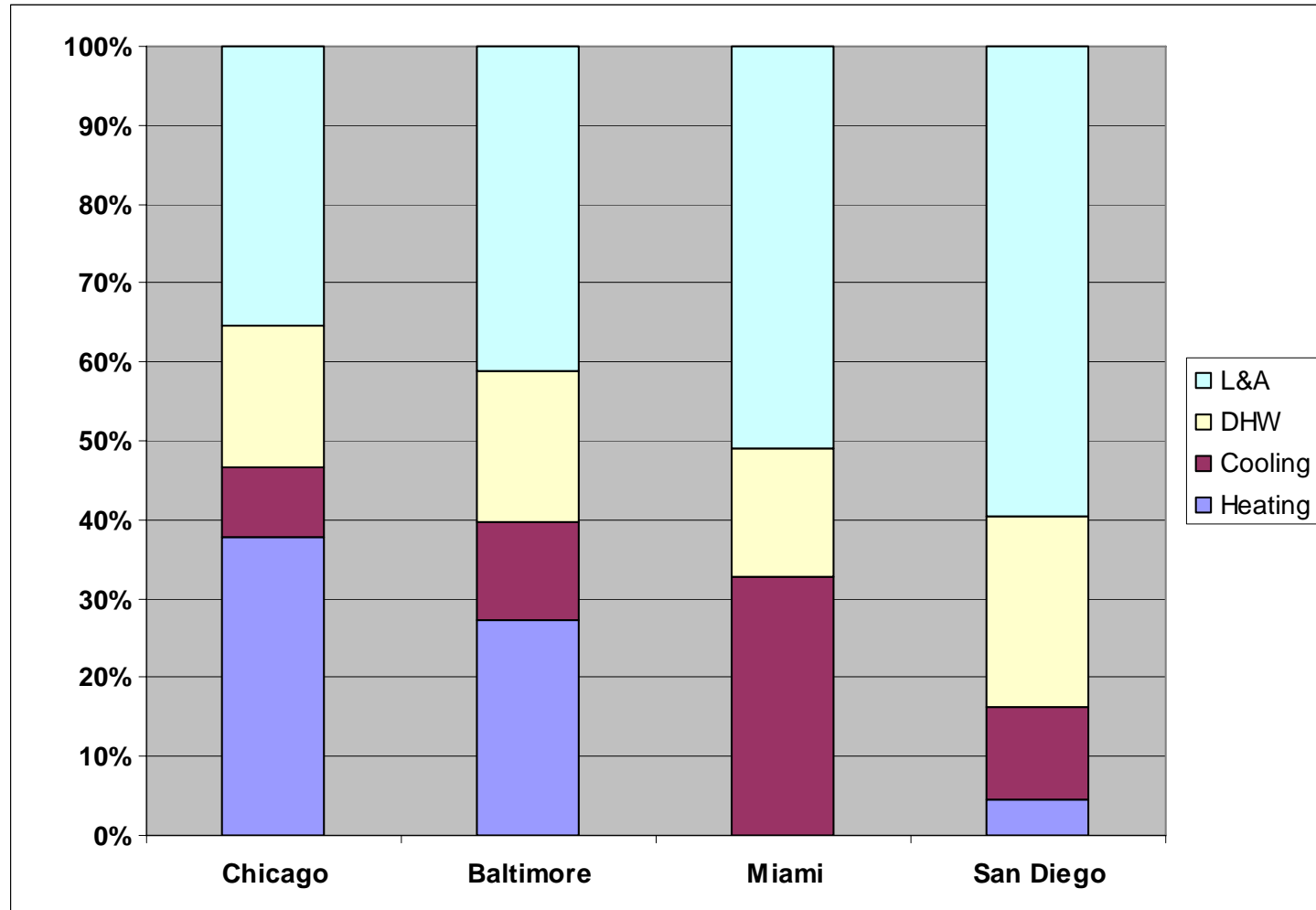
## Four levels of efficiency

1. Base (HERS reference home values)  
Refrigerator: 775 kWh/yr  
Ceiling Fans: 70.4 cfm/W  
Dishwasher: 0.46 EF (cycles/kWh)  
% Fluorescent: 10.0
2. Good  
Refrigerator: 507 kWh/yr, 35% reduction is average Energy Star  
Dishwasher: 0.62 EF, 35% increase is average Energy Star  
Ceiling Fans: 118.2 cfm/W, 68% increase is average Energy Star  
% Fluorescent: 50.0
3. Best  
Refrigerator: 171 kWh/yr, 78% reduction is best Energy Star  
Dishwasher: 1.11 EF, 141% increase is best Energy Star  
Ceiling Fans: 153.2 cfm/W, 118% increase is best Energy Star  
% Fluorescent: 100.0
4. w PV (85 point home only)  
"Good" L&A w/ 2kW PV system

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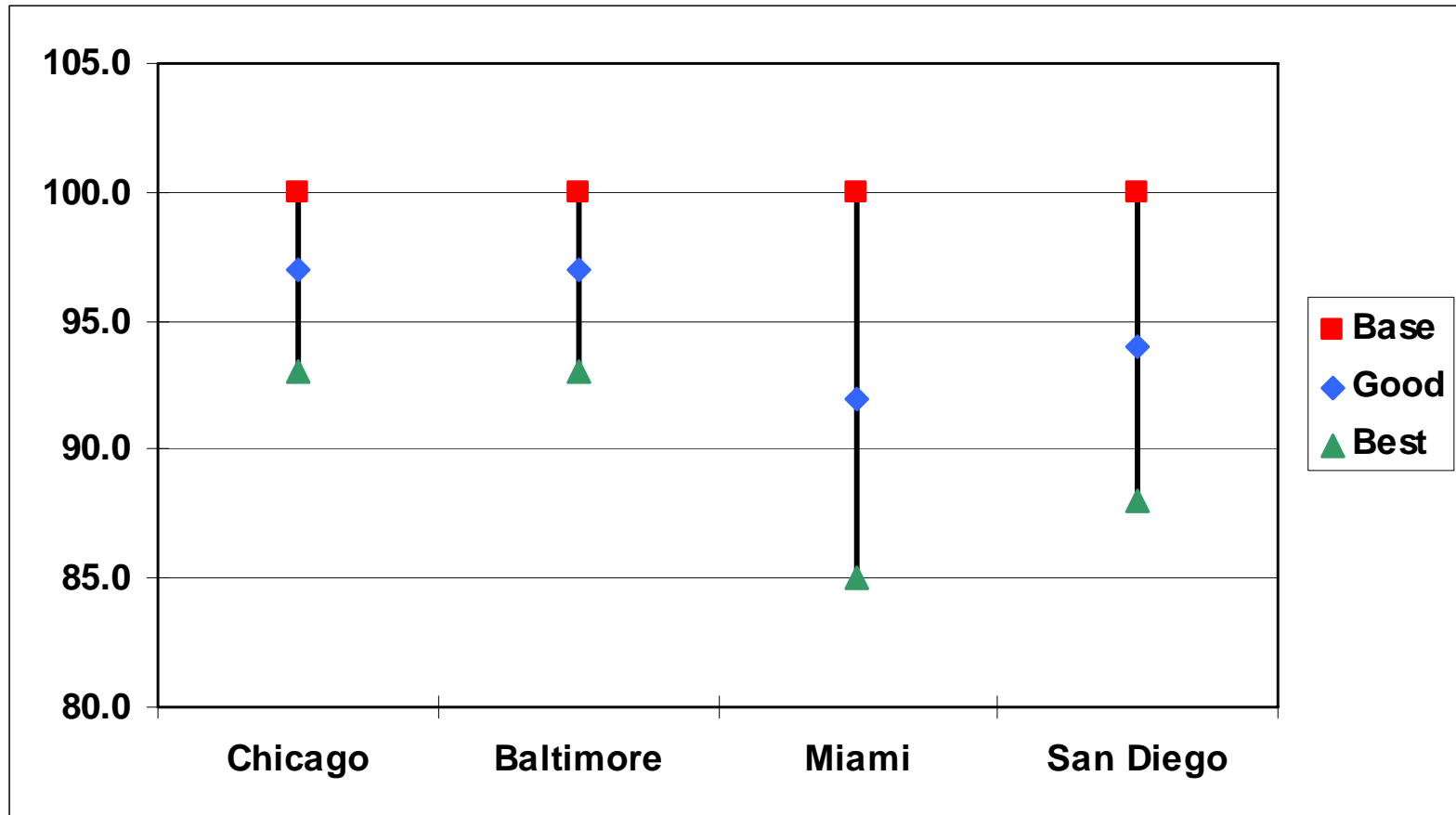
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# End-Use Consumption By Climate



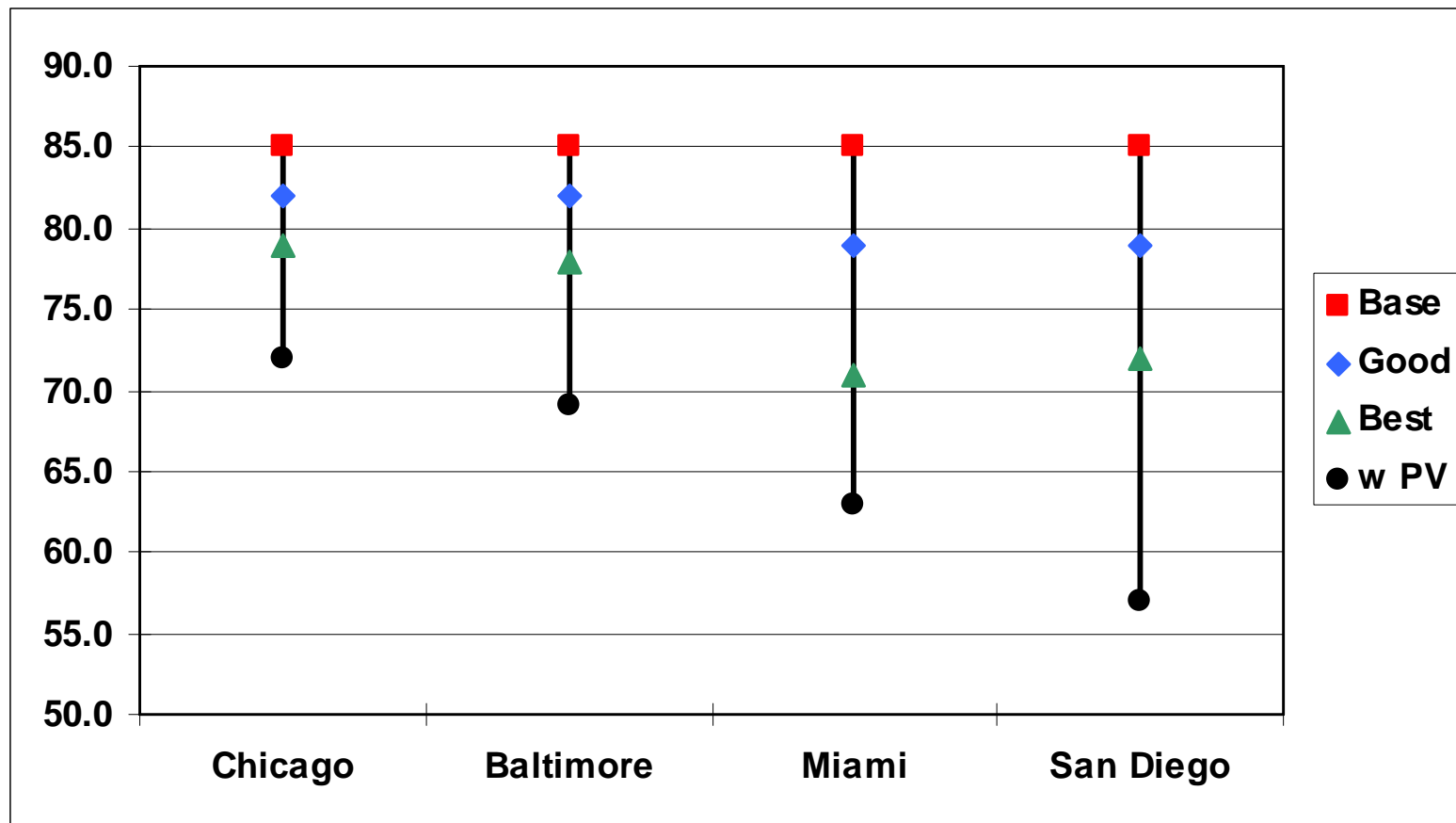
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# Rating Scores for Homes Starting w/ HERS Index of 100 Points



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# Rating Scores for Homes Starting w/ HERS Index of 85 Points (Energy Star)



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**Detailed Lights & Appliances (Not used in HERS Index)** [Set Lights & Appliances Defaults](#)

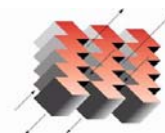
#	Name	Type	Rate		Use	
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New Delete Copy

Properties			
Name:	<input type="text"/>	Fuel / Water:	<input type="text"/>
Type:	<input type="text"/>	Rate:	<input type="text"/>
Location:	<input type="text"/>	Use:	<input type="text"/>
Quantity:	<input type="text"/>	Efficiency:	<input type="text"/>



## REM/*Rate* Implementation



Group of Reports to Consider:

All

Building Selection:

HERS Reports

- Unselected Reports To Consider:
- Action Report (1)

Action - Graphic (1)

Air Leakage Report (1)

Building File Report (1)

Builder Affidavit (1)

Component Loads Summary

Component Loads - Graphic

Comp. Consumption Summary

Comp. Consumption - Graphic

Component Design Loads

Comp. Design Loads - Graphic

Economic Summary (2)

Emissions Report

Energy Cost & Feature

Equipment Sizing Summary

Add >>

Add All >>

<< Remove

<< Remove All

Selected Reports:

Lights & Appliances Summary

Create A Group

Delete A Group



# LIGHTS AND APPLIANCES SUMMARY - HERS

Date: February 21, 2006 Rating No.:

Building Name: Rating Org.:

Owner's Name: Phone No.:

Property: Rater's Name:

Address: Rater's No.:

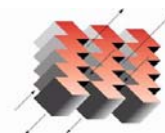
Builder's Name:

Weather Site: Baltimore, MD Rating Type:

File Name: Baltimore 85 Good w PV.big Rating Date:

	REFERENCE	Baltimore 85 Good w PV	DIFF	% DIFF
<b>Electric Consumption (kWh/yr)</b>				
Lighting	2055.0	1521.9	533.2	25.9%
Refrigerator	775.0	507.0	268.0	34.6%
Freezer	0.0	0.0		
Dishwasher	145.0	107.6	37.4	25.8%
Oven/Range	547.5	547.5		
Clothes Washer	90.0	90.0		
Clothes Dryer	900.0	900.0		
Mechanical Ventilation Fan	0.0	0.0		
Ceiling Fan	291.7	173.5	118.3	40.5%
Other	2871.2	2871.2		
Total	7675.4	6718.6	956.9	12.5%

<b>Annual Energy Cost (\$/yr)</b>							
Lighting	\$	115	\$	87	\$	28	24.7%
Refrigerator	\$	43	\$	29	\$	15	33.5%
Freezer	\$	0	\$	0	\$		
Dishwasher	\$	8	\$	6	\$	2	24.6%
Oven/Range	\$	31	\$	31	\$		
Clothes Washer	\$	5	\$	5	\$	-0	-1.7%
Clothes Dryer	\$	50	\$	51	\$	-1	-1.7%
Mechanical Ventilation Fan	\$	0	\$	0	\$		
Ceiling Fan	\$	16	\$	10	\$	6	39.5%
Other	\$	161	\$	164	\$	-3	-1.7%
Total	\$	430	\$	383	\$	47	11.0%





# Home Energy Rating Certificate



5 Stars

## Uniform Energy Rating System

1 Star	1 Star Plus	2 Stars	2 Stars Plus	3 Stars	3 Stars Plus	4 Stars	4 Stars Plus	5 Stars	5 Stars Plus
500-481	400-301	300-251	250-201	200-151	150-101	100-86	85-71	70-51	50-0

HERS Index: **69**

## General Information

Conditioned Area: 2000 sq. ft.  
 Conditioned Volume: 16000 cubic ft.  
 Bedrooms: 3  
 House Type: Single-family detached  
 Foundation: Enclosed crawl space

## Mechanical Systems Features

Air-source heat pump: Electric, Htg: 9.5 HSPF, Clg: 14.0 SEER.  
 Water Heating: Conventional, Electric, 0.91 EF.

Duct Leakage to Outside: Proposed reduced leakage.  
 Ventilation System: None  
 Programmable Thermostat: Heating: No Cooling: No

## Building Shell Features

Ceiling Flat: R-30 Exposed Floor: R-19  
 Vaulted Ceiling: NA Window Type: Double/LoE - Vinyl  
 Above Grade Walls: R-24 Infiltration:  
 Foundation Walls: R-0.0 Rate: Htg: 0.42 Clg: 0.42 ACHnat  
 Slab: None Method: Blower door test

## Lights and Appliance Features

Percent Fluorescent Pin-Based: 50.00 Clothes Dryer Fuel: Electric  
 Percent Fluorescent CFL: 0.00 Range/Oven Fuel: Electric  
 Refrigerator (kWh/yr): 507.00 Ceiling Fan (cfm/Watt): 118.40  
 Dishwasher Energy Factor: 0.62

REM/Rate - Residential Energy Analysis and Rating Software v12.1

This information does not constitute any warranty of energy cost or savings.  
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Rating Number:

Certified Energy Rater:

Date:

Rating Ordered For:

## Estimated Annual Energy Cost

Use	MMBtu	Cost	Percent
Heating	17.9	\$235	27%
Cooling	6.1	\$132	15%
Hot Water	11.9	\$199	22%
Lights/Appliances	22.9	\$383	43%
Photovoltaics	-9.0	\$-150	-17%
Service Charges		\$87	10%
Total		\$886	100%

**This home meets the minimum criteria for all of the following:**

2001 International Energy Conservation Code  
 2003 International Energy Conservation Code  
 2004 International Energy Conservation Code

HER Provider

ABC Ratings

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