



Advanced
ENERGY

**THE BUSINESS CASE
FOR HIGHER
PERFORMING HOMES**

A Report By Advanced Energy

The business case for higher performing homes means designing products that people actually want to buy, and that builders actually make a profit on—instead of persuading them to do things they'd rather not do...



For Homeowners (in 2004)...



“We didn’t pay any attention to energy when we bought our house. We were just thinking about the size of the house, the number of bedrooms...”

“A lot of people buying my homes today are driving Hummers. Why in the world would they care about saving energy?”



For Builders...



“The main question is, am I going to get pay back out of this?”

“If you really have to sell it to the customer, then what’s the advantage?”



For The Power Company...



*“Promote it with a rebate.
If it’s gonna cost \$3,000,
I’d like someone to share
the hit.”*



The Business Case Requires...

- ❖ Homeowners have to prefer a high performance house, even at a higher price
- ❖ Builders must become convinced they can earn a higher ROI with a high performance house
- ❖ Power companies must see a benefit



Our Agenda...

Home Energy Efficiency Study (EPA)

Have energy efficiency programs in new home construction resulted in a reduction of energy consumption (HVAC)?

Homeowner Satisfaction Survey (DOE)

Are owners of program homes more satisfied than owners of baseline homes?

The Business Case



EPA Methodology

Lots of variables, lots of houses [7141]

House classifications

- Baseline [B]
- Energy Star [ES]
- Guarantee performance [GP]

Final data set [gas, no swimming pool]

House characterization [vintage, sq. ft., window type, HVAC type, orientation, pool/no pool, fuel]

Monthly utility data [1998-2004]



Phoenix, Arizona - Home Energy Efficiency Study (EPA)



2004 NEW HOME MARKET	SINGLE-FAMILY PERMITS ISSUED
Phoenix, AZ	57,360
Atlanta, GA	57,316
Dallas-Fort Worth, TX	45,908
Houston, TX	45,103
Orange County, CA	43,142
Chicago, IL	35,810
Las Vegas, NV	31,741
Orlando, FL	27,493
Washington, DC	26,940
Miami, FL	24,653
Charlotte, NC	17,722
Raleigh, NC	12,083
The Triad	8,154
Wilmington, NC	6,861
Asheville, NC	3,138

Source: U.S. Census Bureau, "New Privately Owned Housing Units Authorized in 2004 (Unadjusted) by Metropolitan Area"



Baseline Homes...

Baseline Homes are homes built to local code. Baseline homes built after 1998 were anecdotally considered to be 20% more efficient than homes built to 1993 Model Energy Code (MEC) standards in Phoenix.



Energy Star® Homes...



Energy Star® Homes meet or exceed the energy efficiency standards set by the EPA's Energy Star program. By definition, Energy Star qualified homes are independently verified to be at least 30% more energy efficient than the same home built to 1993 MEC, or 15% more efficient than the state code, whichever is the strictest.



Guaranteed Performance Homes...

Guaranteed Performance Homes are designed to go beyond the Energy Star program by using advanced energy efficient materials and construction techniques to lower residential energy use even further. The standards and testing protocols are more stringent than for Energy Star.



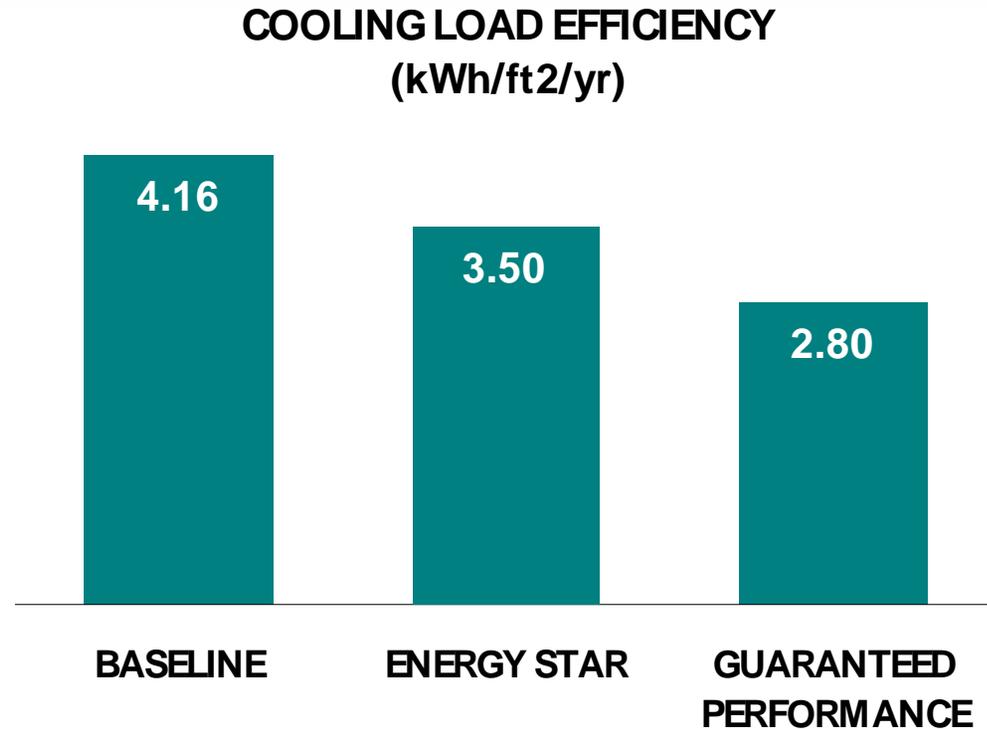
What “extra” went into an EFL home...



- ❖ Construction Techniques
- ❖ Training
- ❖ Guarantees
- ❖ Feedback Loops

Improved Cooling Efficiency

For cooling, GP homes are 20% more efficient than Energy Star homes and 33% more efficient than baseline homes...

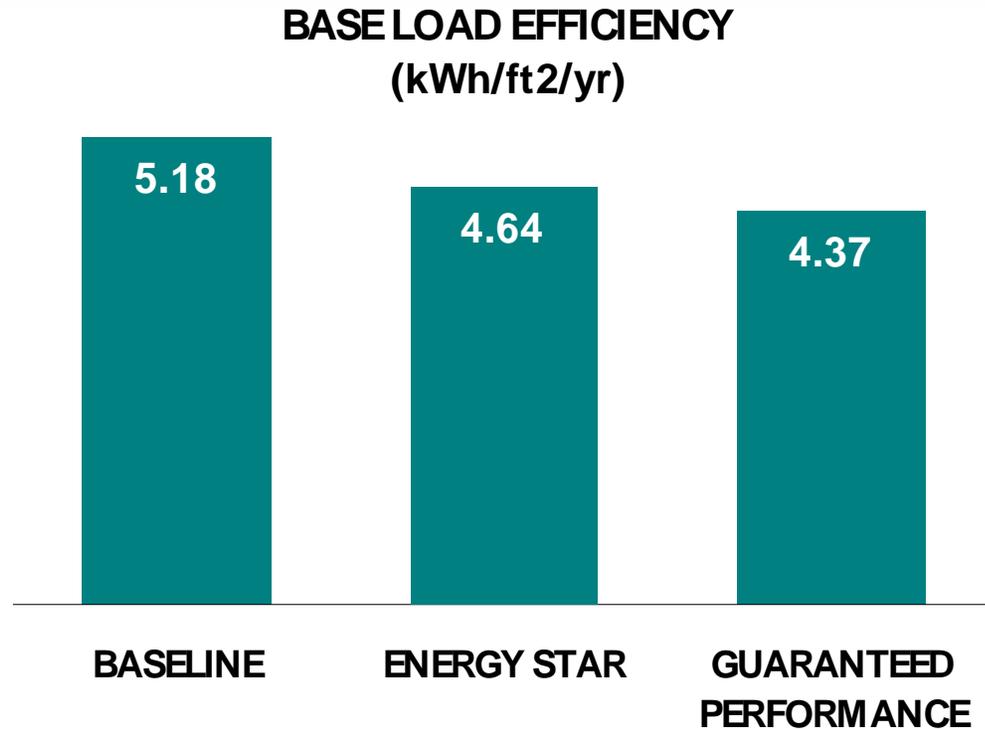


Note: Data are for a home heated with gas and no swimming pool.



Improved Base Load Efficiency

For base loads, GP homes are 6% more efficient than Energy Star homes and 16% more efficient than baseline homes...

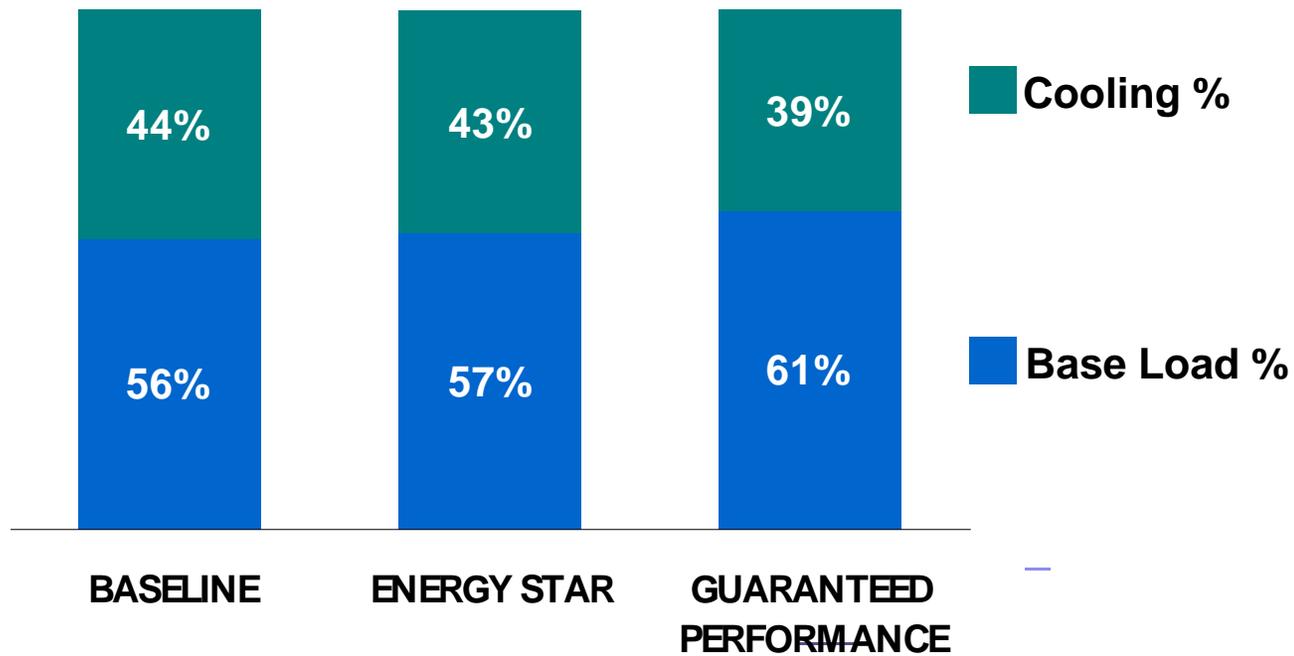


Note: Data are for a home heated with gas and no swimming pool.



Base Loads Are Critical

COMPOSITION OF THE LOAD

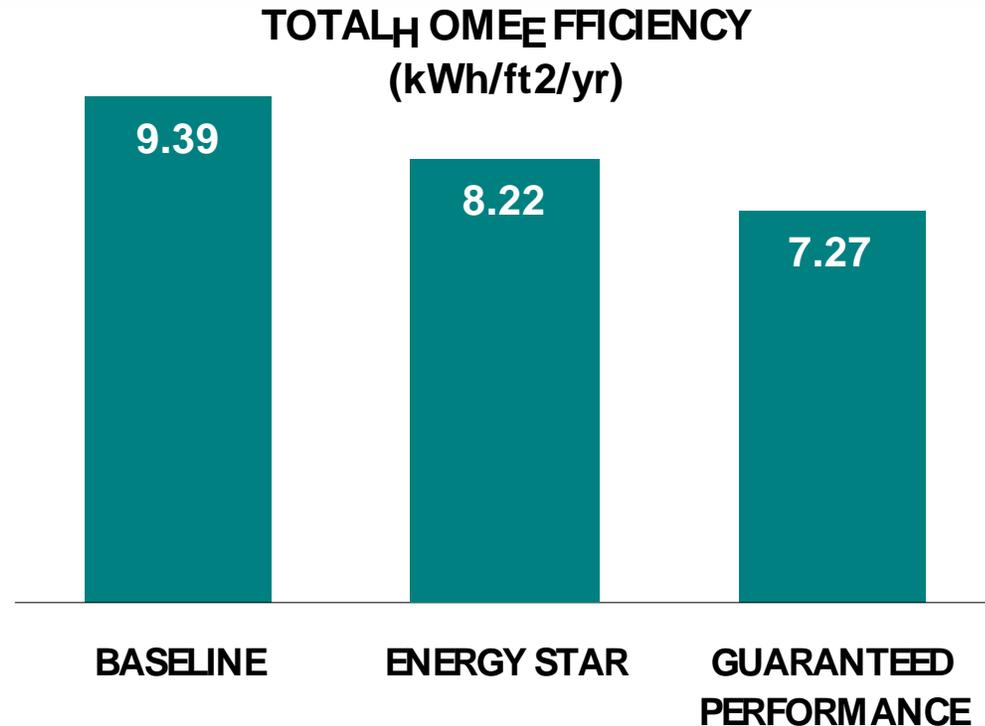


Note: Data are for a home heated with gas and no swimming pool.



Improved Overall Efficiency

Overall, GP homes are 12% more efficient than Energy Star homes and 23% more efficient than baseline homes...



Note: Data are for a home heated with gas and no swimming pool.



Conclusions...

- ❖ Energy Star and Guaranteed Performance homes are more efficient
- ❖ Base loads amount to almost 60% of total energy consumed



The DOE Homeowner Satisfaction Survey

Are owners of program homes more satisfied than owners of baseline homes?



Methodology

Phoenix market [same sample as EPA study]

House categories [B, ES, GP]

Qualitative research

- Homeowners, builders, contractors – what drives satisfaction?
- Focus groups

Quantitative research

- Survey sent to 7,000 homeowners [10% response]
- Limitations



Over 700 Phoenix homeowners were surveyed...

DEMOGRAPHIC	BASELINE HOMES	ES HOMES	GP HOMES	TOTAL SURVEY
Average household size	2.7	2.9	2.5	2.7
Percent of household occupants under the age of 18	28%	32%	20%	27%
Percent of homes with household incomes over \$50,000	60%	67%	77%	68%
Percent of respondents under the age of 45	47%	58%	33%	46%
Percent of homes over 1,600 square feet	53%	60%	86%	68%



It's Not Just About Efficiency



Performance isn't just about energy efficiency. It's also about comfort, reliability and healthiness...



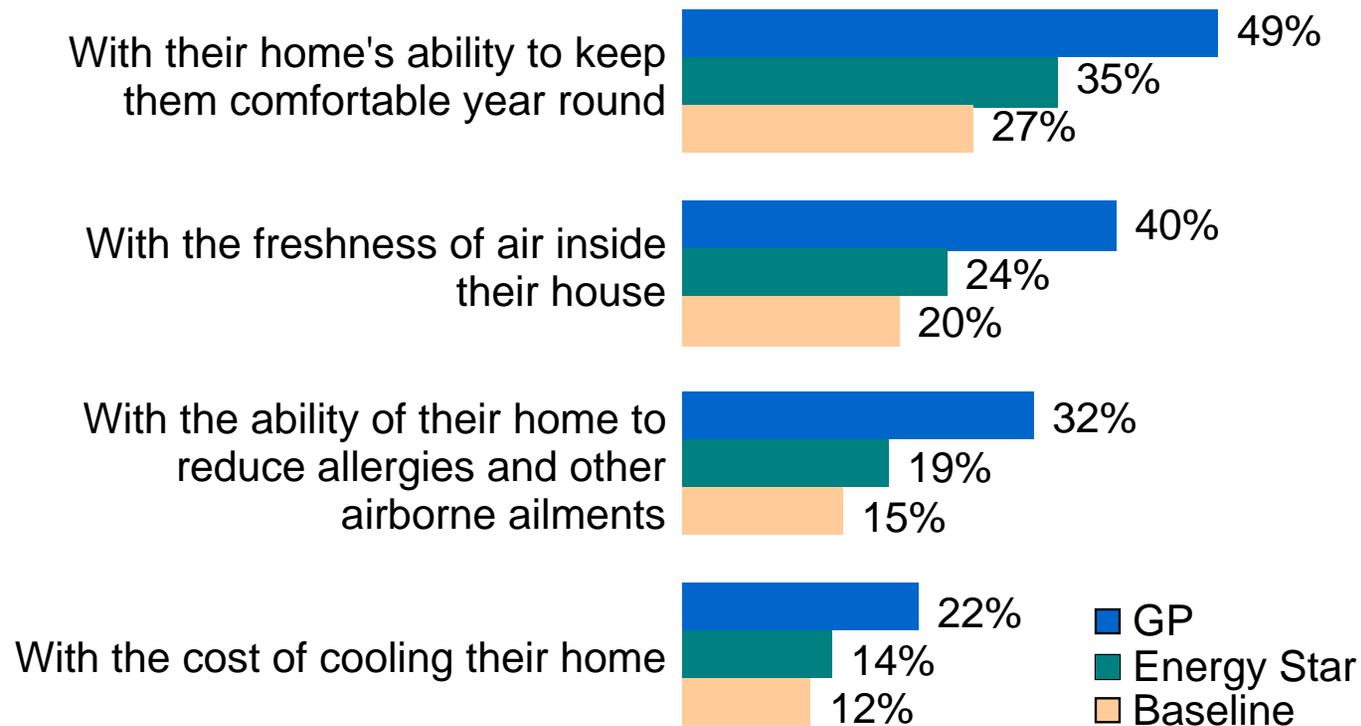
It's Not Just About Efficiency

PRIMARY NEED	DRIVERS OF SATISFACTION
COMFORT	The ability of your home to keep you comfortable year round
	Evenness of temperatures from room to room in the summer and winter months
	The ability of your air conditioner to cool your home down quickly
	The ability of your heating system to warm your home up quickly
	The ability to regulate temperatures during all seasons
ENERGY EFFICIENCY	The cost of cooling your home
	The cost of heating your home in winter
RELIABLE PERFORMANCE	The reliability of your heating & cooling system (i.e., repair frequency)
	The noise of your heating & cooling system when running
HEALTHINESS	The ability of your heating & cooling systems to reduce allergies and other airborne ailments in your home



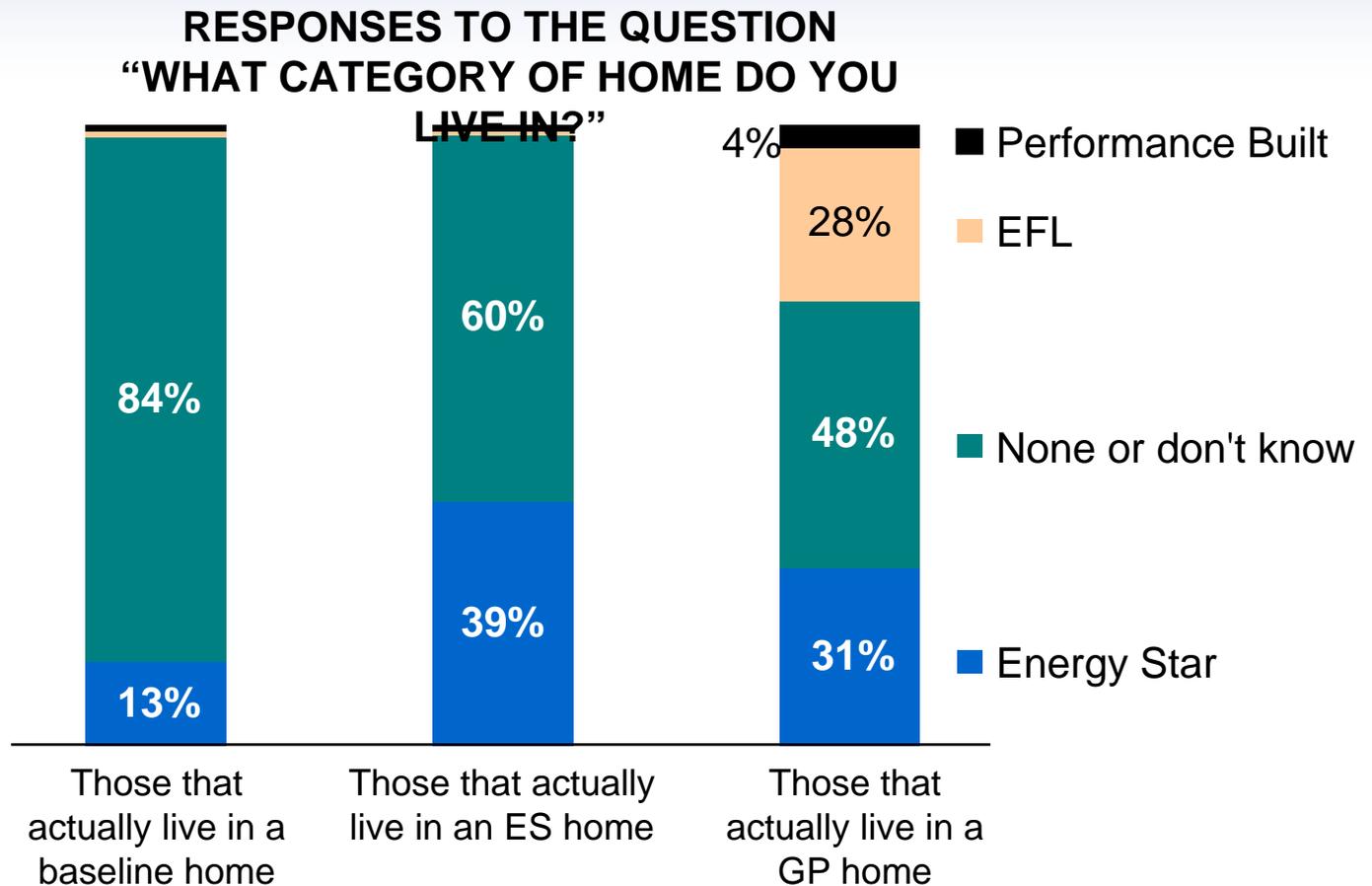
Homeowners Are More Satisfied...

PERCENT OF HOMEOWNERS THAT ARE COMPLETELY SATISFIED



Lack Of Awareness

They're often not even aware of the type of house they own...



Energy Management

Behavior	% Of Baseline Homeowners	% Of ES Homeowners	% Of GP Homeowners
I don't adjust the thermostat; I leave it set on a fixed temperature even if the house is empty for the day	33%	43%	52%
I adjust the thermostat by a few degrees, and then return it to the desired setting when I return home.	62%	54%	46%
I turn the thermostat off until I return later in the day	5%	3%	3%



Conclusions...

- ❖ Consumer satisfaction rests on comfort, reliability and perceived healthiness...as well as efficiency
- ❖ Energy Star and Guaranteed Performance homeowners are more satisfied with comfort, energy cost and healthiness than baseline homeowners
- ❖ Homeowners are still largely unaware of the various energy programs
- ❖ Homeowners in higher performing homes manage their thermostats differently



Requirements...

- ❖ Homeowners have to prefer a high performance house, even at a higher price,
- ❖ Builders must become convinced they can earn a higher ROI with a high performance house, and
- ❖ Power companies must see a benefit.



A Major Consumer Marketing Opportunity

The lesson from the Phoenix projects is that there is latent consumer demand for the idea of higher performing homes. However, the value proposition should **not** be based solely on energy-efficiency; it should be based on comfort, perceived healthiness, reliability and economy...



An Opportunity For Brand Leadership

There is an opportunity for utilities, builders, and equipment manufacturers to build brand awareness and identity. Leadership is up for grabs on several fronts—product leadership, brand leadership, and even “thought leadership,” where an enterprise becomes indelibly associated with the idea of higher performing “robust” homes.



The Case For Utility Benefits



- ❖ Homeowner satisfaction
- ❖ Stronger partnerships with builders
- ❖ More rational use of energy in the housing sector

The Case For Utility Benefits

Our hypothesis is that peak demand is reduced in a higher performing home...

- ❖ Downsized HVAC systems
- ❖ Improved thermal envelope

