



Building America

Beyond RD&D: DOE as a Partner

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Climate VISION Roundtable for Energy
Efficient Homes

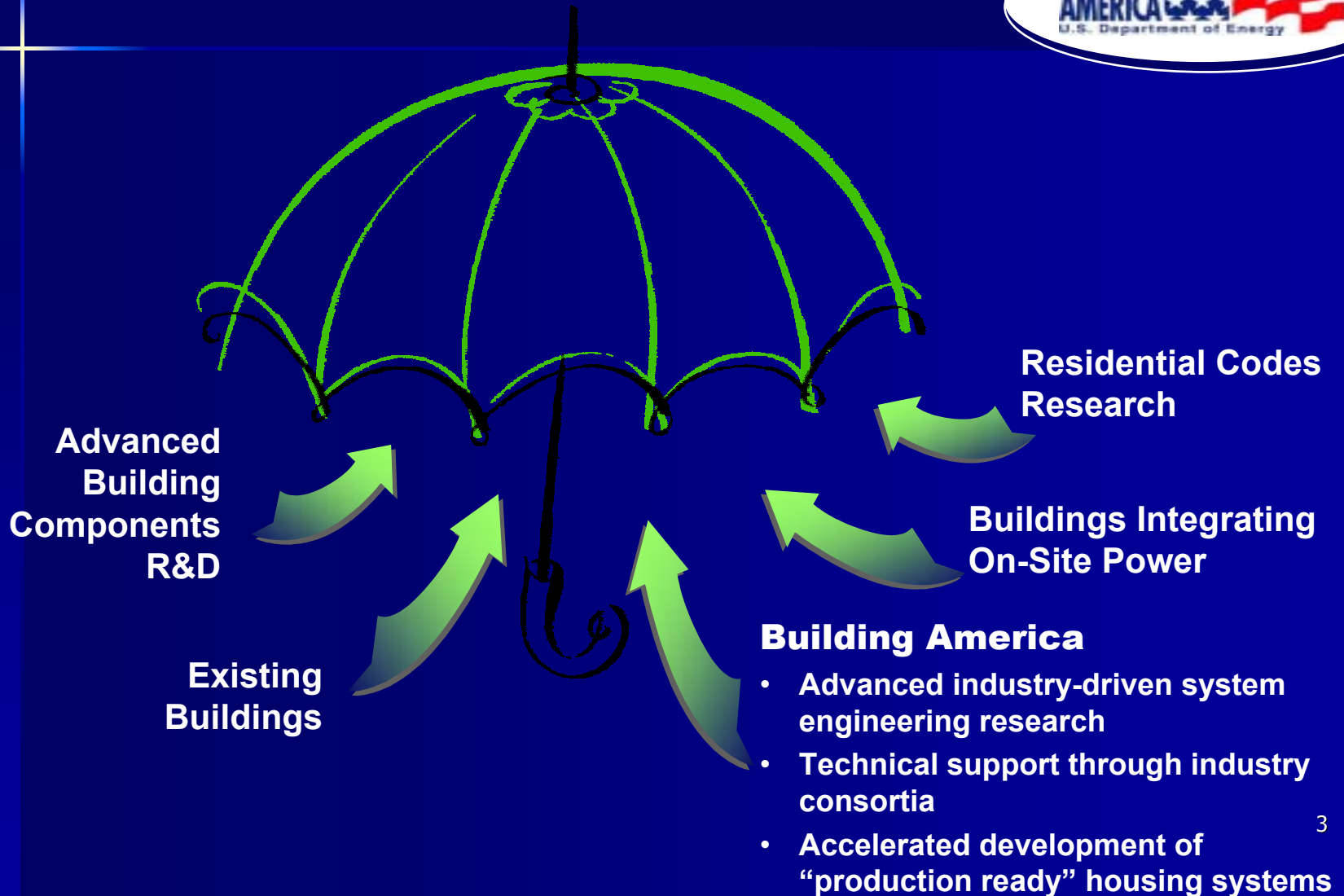
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Moving Toward “Zero Energy Buildings”

- Buildings that are energy efficient, and produce their own energy—over the course of the year, they don’t use more energy than they produce
- Efficiencies of 50-70% *plus* on-site or purchased green power 30-50% = 100%
- Whole Buildings + Best Components + Vision + Design = Zero Energy Buildings ... In our lifetime!

Advanced Systems Target



Building America's Industry Teams

*Industry
Teams*

Team Members Include:

**DOE Building America
System Research**
(www.buildingamerica.gov)

- **Lead Builders**
- **Material Suppliers**
- **Designers**
- **Developers**
- **Utilities**
- **Manufacturers**

Technology Centers

Building America Communities

- Over 270 builders and manufacturers
- More than 20,776 energy-efficient houses
- In 31 states



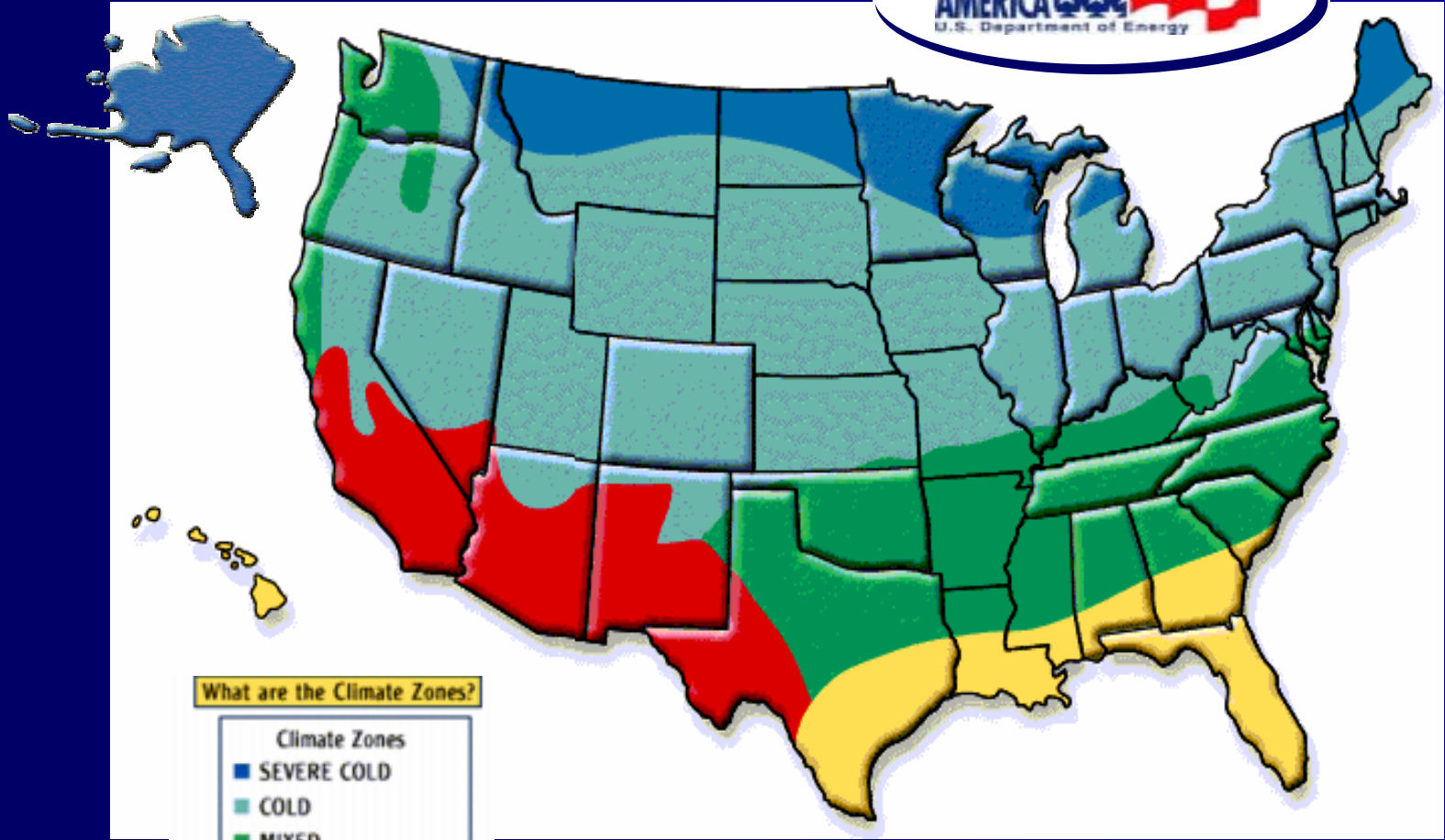


Approach

Building America teams of leading experts in building science and system engineering offer production home builders, remodelers, and home builders cost-shared technical support

- Design reviews
- Energy modeling
- Performance specification writing
- Training and workshops
- On-site consulting
- Access to Building America research

Moisture and Thermal Climate Zones

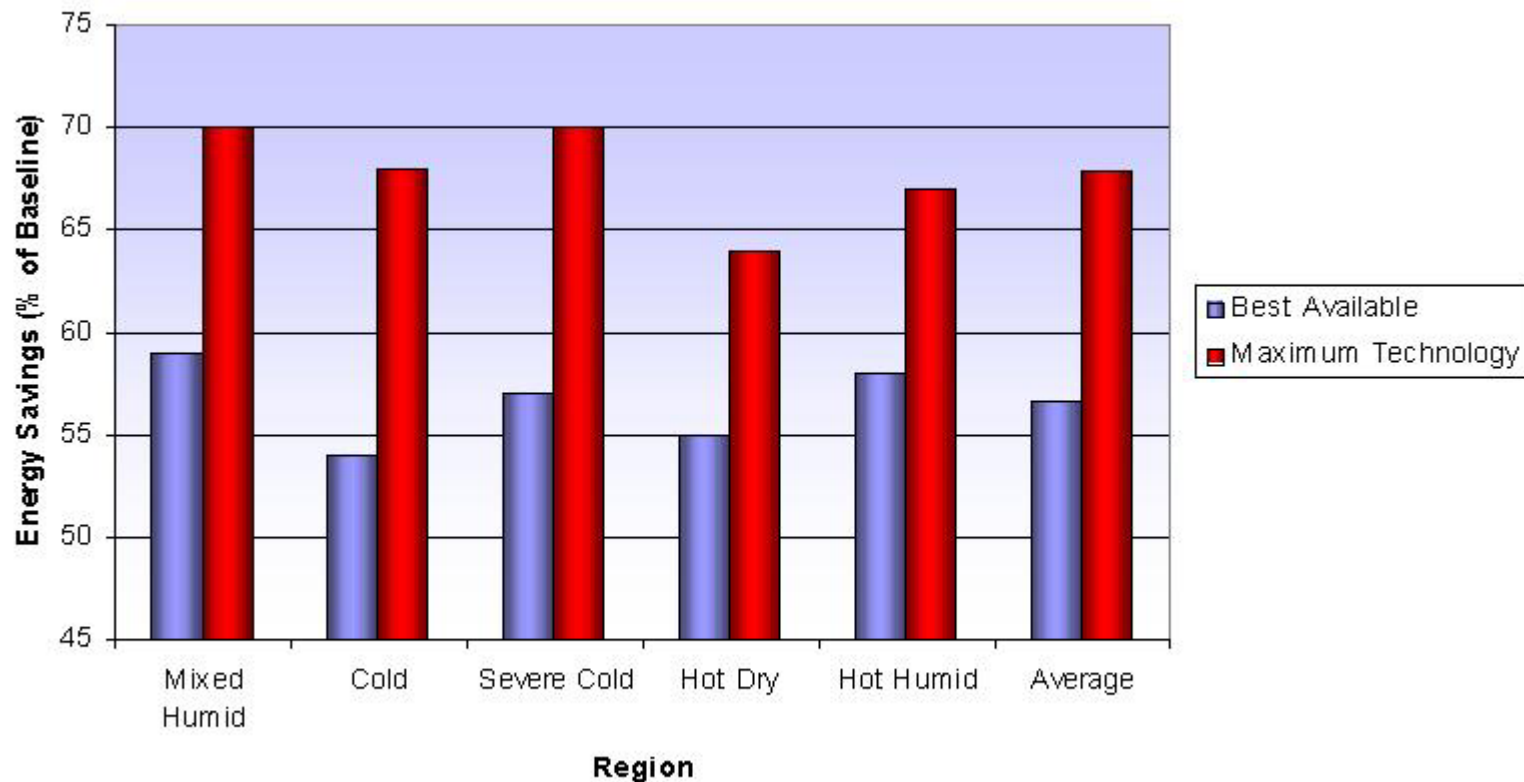


What are the Climate Zones?

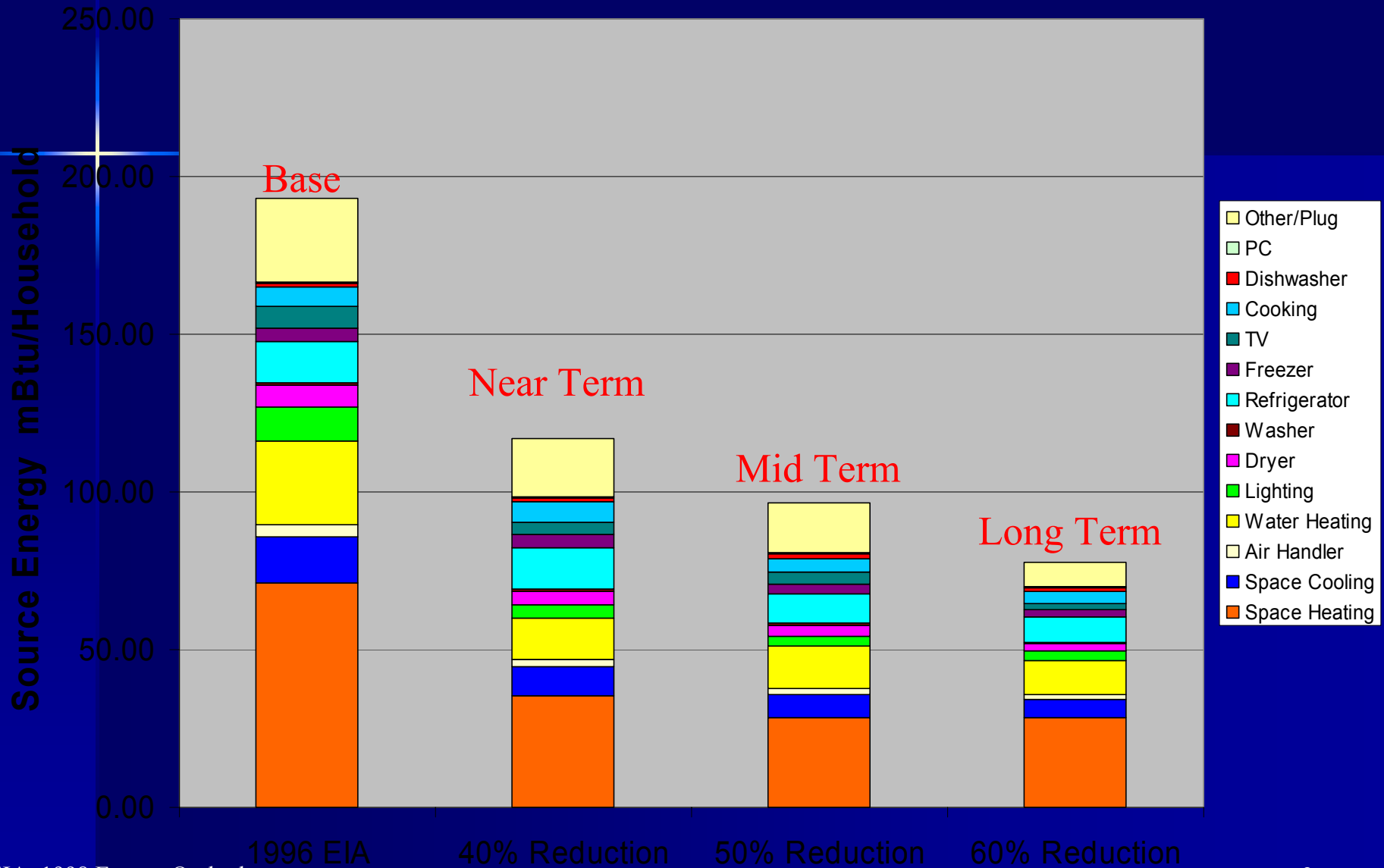
- | Climate Zones | |
|---------------|-------------------|
| ■ | SEVERE COLD |
| ■ | COLD |
| ■ | MIXED |
| ■ | HOT-HUMID |
| ■ | HOT-DRY/MIXED-DRY |

Residential Optimization Model

For all five regions, the average energy reduction attainable is 57% with best available technologies and 68% with maximum technologies.



Building America Energy Use Reduction Targets



About 20,000 High Performance Production Homes, But How?

- In general, Building America focuses on:
 - Identifying break points & creating meaningful cost trade-offs
 - Solving builder warranty & liability problems
 - Creating market differentiation
- Applied building science is the engine driving this train

System Trade-offs Summary

- HVAC downsizing (driven by right sizing, simplified ducts, and reduced loads of better windows) “finances” better windows
- Advanced framing lumber savings “finances” increased levels of insulation and air sealing
- These trade-offs are often, but not always, about cost neutral

Building Science Consortium

Copper Moon

1,618 sq ft



Tucson, Arizona

Features

- ▣ Unvented cathedral attic
- ▣ Low-E² spectrally selective windows
- ▣ Sealed ducts with mechanical ventilation
- ▣ Stack framing
- ▣ Blown cellulose wall and ceiling insulation

Cost Summary for Building America Metrics—Copper Moon, Tucson, AZ

Unvented roof	+ \$ 750
NOT installed roof vents	– \$ 500
High performance windows	+ \$ 300
Controlled ventilation system	+ \$ 150
Downsize air conditioner by 2 tons	– \$ 1000
Sealed combustion furnace	+ \$ 400
<i>TOTAL PREMIUM</i>	+ \$ 100

System Trade-offs: Pulte MN Case Study

Advanced framing	-\$250
High performance windows	+\$250
Controlled ventilation system	+\$150
Power vented gas water heater	+\$300
Simplified duct distribution	-\$250
Downsize air conditioner by 1.0 ton	-\$350
TOTAL PREMIUM	-\$150



Benefits for Builders

Through research, Building America helps builders

- Lower customers' energy bills by 30–70%
- Improve comfort and indoor air quality
- Reduce construction costs and waste
- Reduce callbacks and warranty claims
- Offer cost-saving building system trade-offs
- Stand out in the marketplace
- Provide new product opportunities
- Learn from other builders

Reduced Warranty & Liability

- Relating to comfort that **also saved energy**
- Relating to mold that was the result of:
 - Energy conservation (more insulation, tight construction)
 - Misplaced / mis-used vapor barriers
 - Lack of ventilation
 - Lack of water management
- Related to quality that **also saved energy**
- Related to material efficiency that **also saved energy**

NOTE: Same approach shows builders the practicality of risk reduction for energy and comfort

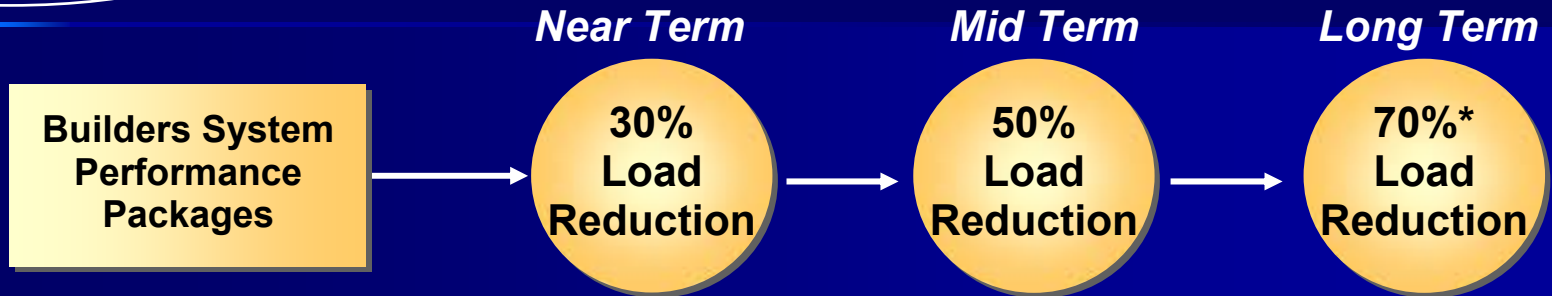
Benefits for Homeowner (Insurance & Mortgage Industry)

- Lower energy use
- Increased durability of home
- Healthier indoor environment
- Improved comfort
- Higher resale value

Risk Assessment Protocol (RAP)

- Quality Assurance through proper design and selection of correct materials
- Quality Control using checklists on the job site
- Maintain Performance by providing homeowner checklists

Builders System Performance Packages



**Overall building load*





Want to know more?

- Buildings.gov
- BuildingAmerica.gov
- NREL.gov

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