APPRAISAL INDUSTRY SEMINARS

ENERGY STAR

The Canary in the Coal Mine:
ENERGY STAR and the Appraisal Process

Sam Rashkin, R.A.
National Director, ENERGY STAR for Homes

OUTLINE

- *Appraising What You Can't See*
- *Sign of a Changing Environment: ENERGY STAR Label for Homes*
- *The Science Behind the Value*
- *Adding Value with Energy Efficiency*
- *Appraising Options*

WHY HERE TODAY?

- ***Increase Expertise***
  - *better quality service*
  - *increased customer satisfaction*
  - *reduce risk*
- ***Prepare for Future***
  - *proactive vs. reactive*
- ***Do the Right Thing***
  - *accurately assess value*
  - *help the environment*

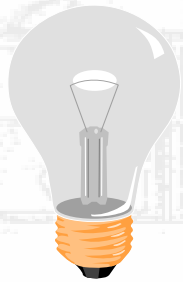
APPRAISING
WHAT YOU CAN'T SEE

APPRAISING WHAT YOU CAN'T SEE

LIGHT BULB: VALUE BASED ON PRICE

ENERGY STAR

Incandescent Light Bulb



$.50

Compact Fluorescent Light Bulb (CFL)

$5.00

APPRAISING WHAT YOU CAN'T SEE

LIGHT BULB PERFORMANCE

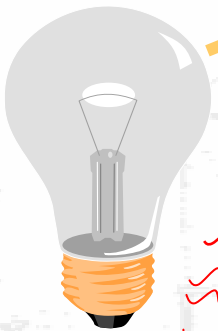
ENERGY STAR

Compact Fluorescent vs. Incandescent:

Same Light, ~80% less heat, 800% more durability

100 Watts

100% Electricity



10 Watts Light [10%]

90 Watts Heat [90%]

1,000 Hour Life

26 Watts

100% Electricity

10 Watts Light [40%]

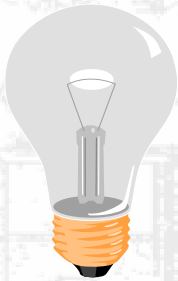
16 Watts Heat [60%]

8,000 Hour Life

APPRAISING WHAT YOU CAN'T SEE

VALUE BASED ON PERFORMANCE

Incandescent Lighting
(8 years)



Init. Investment:	$ .50
8-yr. Operation:	$64.00
8-yr. Added Cool'g:	$12.00
Bulb Replacement:	$ 3.50

***Total Cost*: $80.00**

CFL Lighting
(8 years)

Init. Investment:	$ 4.00
8-yr. Operation:	$16.00
8-yr. Added Cool'g:	$ .00
Bulb Replacement:	$ .00

***Total Cost*: $20.00**

APPRAISING WHAT YOU CAN'T SEE

NEW VALUE INDICATORS FOR HOMES:

ENERGY STAR

Consumer Interest:

- ***Property damage cases in courts***
  ~9,000 moisture and mold intrusion cases
  [American Banker, 1/30/03]
- ***Homeowner moisture problems inquiries***
  30%, double next closest subject
  [NAHB Research Center]
- ***Consumer willingness to pay***
  ~65% willing to pay $2,500 for energy efficient home
  ~90% willing to pay $5,000 for improved IAQ.
  [Cahners Publications 2001 Consumer Survey]

APPRAISING WHAT YOU CAN'T SEE

NEW VALUE INDICATORS FOR HOMES

ENERGY STAR

Asthma:

- *Percent of children getting asthma has doubled in two decades (1980-2001).*
  [American Lung Association]
- *~50% of homes have family members with asthma, allergy or respiratory problems*
- *Health insurance cost related to asthma in the U.S. total $13 billion annually.*
  [Mayo Clinics study]

APPRAISING WHAT YOU CAN'T SEE

NEW VALUE INDICATORS FOR HOMES

ENERGY STAR

Fannie Mae Energy Efficiency Mortgage:

- ***Adds the net present value of the energy savings to the value of the home***
  for determining loan-to-value ratios
- *Adds monthly energy savings to the borrowers income*
- *Fully integrated with Desktop Underwriter*

APPRAISING WHAT YOU CAN'T SEE

NEW VALUE INDICATORS FOR HOMES

ENERGY STAR

J.D. Power and Associates
2003 New-Home Builder Customer Satisfaction Study℠

Overall Satisfaction Index Scores

Market	2003	2002	2001	Difference from 2002 to 2003
Major Market Total	**109**	**101**	**100**	**+ 8**
Phoenix	118	111	110	+ 7
Las Vegas	116	106	106	+ 10
Austin *	115	n/a	n/a	n/a
Tucson *	114	n/a	n/a	n/a
Dallas/Ft. Worth	113	99	96	+ 14
Charlotte	111	111	103	none
Chicago	109	101	97	+ 8
Raleigh/Durham *	109	n/a	n/a	n/a
Sacramento	109	101	n/a	+ 8
Tampa	109	103	n/a	+ 6
Houston	107	100	100	+ 7
San Francisco Bay Area	107	96	n/a	+ 11
Southern California/San Diego	107	101	102	+ 6
Atlanta	106	99	n/a	+ 7
Orlando	106	102	99	+ 4
Denver/Colorado Springs	105	88	89	+17
Palm Beach *	105	n/a	n/a	n/a
Minneapolis/St. Paul	104	93	n/a	+ 11
Philadelphia	100	93	n/a	+ 7
Washington, D.C.	100	96	88	+ 4
Ft. Lauderdale *	91	n/a	n/a	n/a

Builder Quality Rankings:

14 of 21 Markets Included in JD Power Assoc. Study had an ENERGY STAR Partner Ranked at Either #1, #2, or Both

Largest ENERGY STAR market, Las Vegas, scored 2nd highest in U.S. including 9 of top 10 scores to ENERGY STAR partners

APPRAISING WHAT YOU CAN'T SEE

NEW VALUE INDICATORS FOR HOMES

Gainesville, FL Case Study:

After comparing nearly identical 1,500 sq. ft. homes, resold in a Gainesville, Florida subdivision, ***one ENERGY STAR labeled and the other not:***

"I found a $4,000 value to ENERGY STAR certification.

This was one of the best appraisals involving ENERGY STAR certification I have done recently."

Karl Sayles

Darty Appraisal Service

Melrose, Florida

APPRAISING WHAT YOU CAN'T SEE

WHAT WE KNOW

ENERGY STAR

Energy efficient and healthy homes:

- *Strong performance advantage that you can't see...*

  value of "$0" is wrong.

- *But, appraisers need a consistent system for assessing the value*

SIGN OF A CHANGING ENVIRONMENT:

ENERGY STAR LABEL FOR HOMES

WHAT IS ENERGY STAR?

The national, US government-backed

symbol for energy efficiency

WHY ENERGY STAR?

- **Consumers:**
  A simple way to identify products that save energy, money, and the environment without sacrifice
- **Manufacturers and Home Builders:**
  A specification and label to help distinguish their energy efficient products and homes
- **EPA:**
  Fights air pollution and climate change one product, home, building at a time

ENERGY STAR BACKGROUND

- **Launched** in 1992 for computers
- **Grown** to products across 40+ categories
  - 1995 - new homes
  - 1999 - efficient buildings
  - 2003 - updated logo

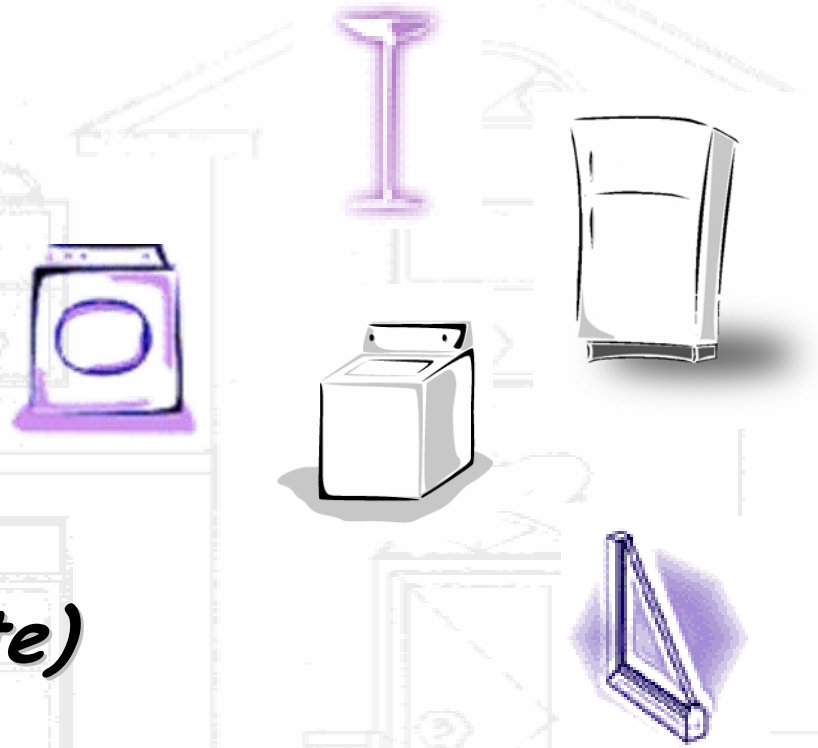
Before

After

- **Sold** 1+ billion products
- **Prevented** greenhouse gas emissions equivalent to those from 18 million vehicles

ENERGY STAR PRODUCTS FOR HOMES

- Homes
- Lighting
- Appliances
  - Clothes Washer
  - Refrigerator
  - Dishwasher
- Windows (by Climate)
- Thermostats
- Ventilation Fans



ENERGY STAR GROWING BRAND

- **~60% consumer recognition**
- **90+% of consumers**
  say they will look for ENERGY STAR qualified products after hearing about ENERGY STAR
- **90+% of consumers**
  believe that saving energy is important for both the environment and their pocketbooks…
  They just don't know where to start

WHAT IS ENERGY STAR FOR HOMES?

- ***Voluntary***
- ***Truly Energy Efficient***
  30% > MEC, and 15% > State Code
- ***Credible***
  Government-Backed Label
  Third-Party Verified

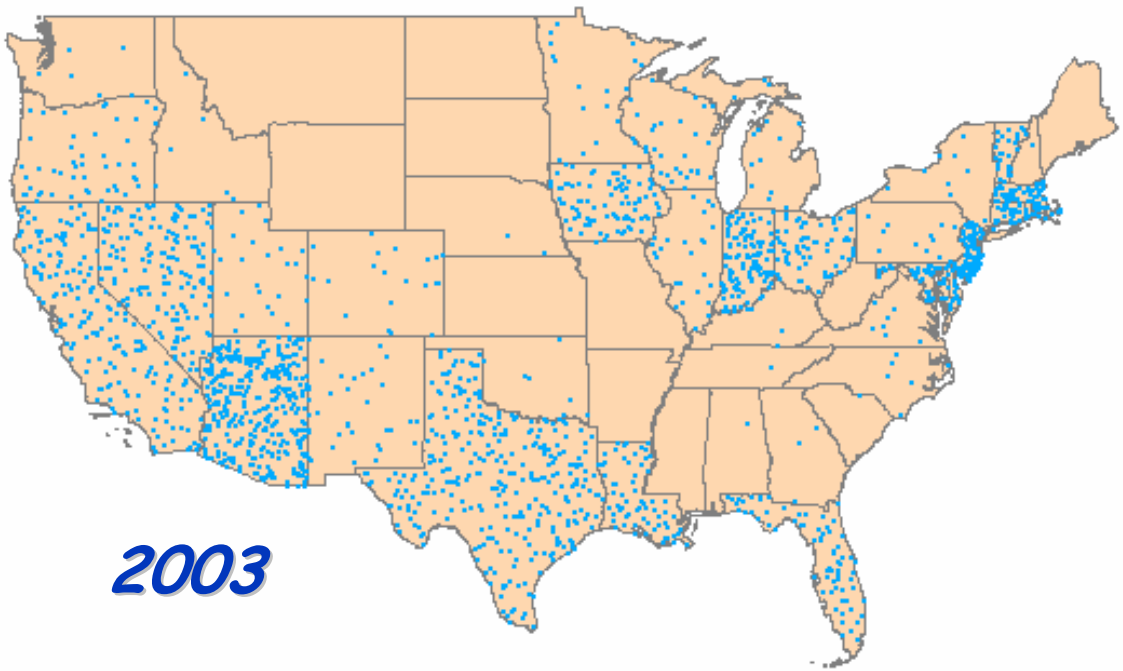
ENERGY STAR LOGO AND LABEL

Certification Mark

Label:
Typically on interior utility box

ENERGY STAR FOR HOMES VIRUS

Each dot = 50 labeled homes



2003

ENERGY STAR FOR HOMES VALUE

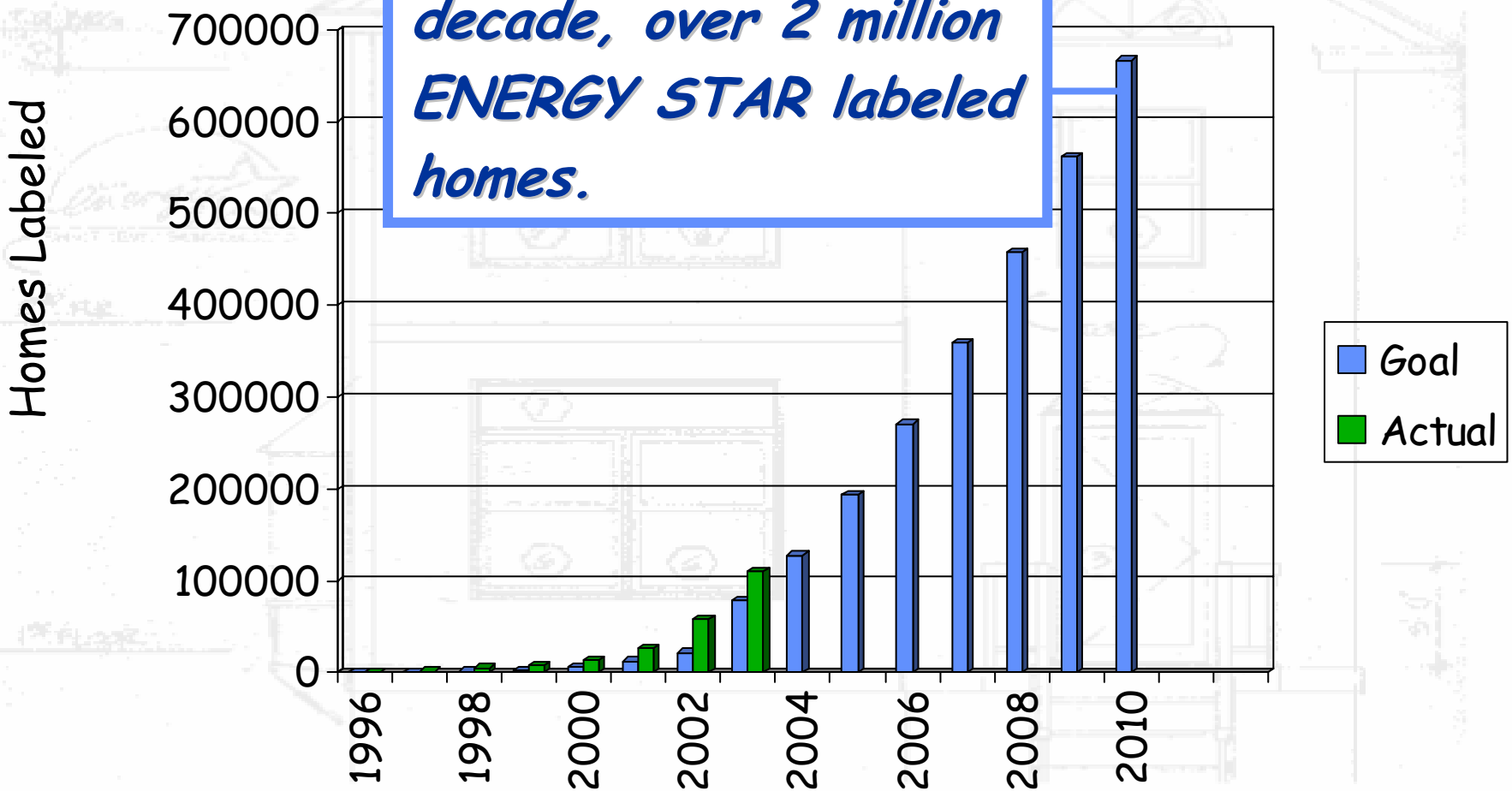
"As consumers become more educated and familiar with all of these benefits that energy efficiency has to offer,

in five years non-ENERGY STAR rated homes will become functionally obsolete."

Karl Sayles
Darty Appraisal Service
Melrose, Florida

ENERGY STAR FOR HOMES FUTURE

By the end of the decade, over 2 million ENERGY STAR labeled homes.



ENERGY STAR PLUS IAQ LABEL
(2005 PILOT)

THE SCIENCE BEHIND THE VALUE

THE SCIENCE BEHIND THE VALUE

WHY CONTROL AIR FLOW?

Impact:

All action happens at surfaces where warm air can condensate on cold surfaces.

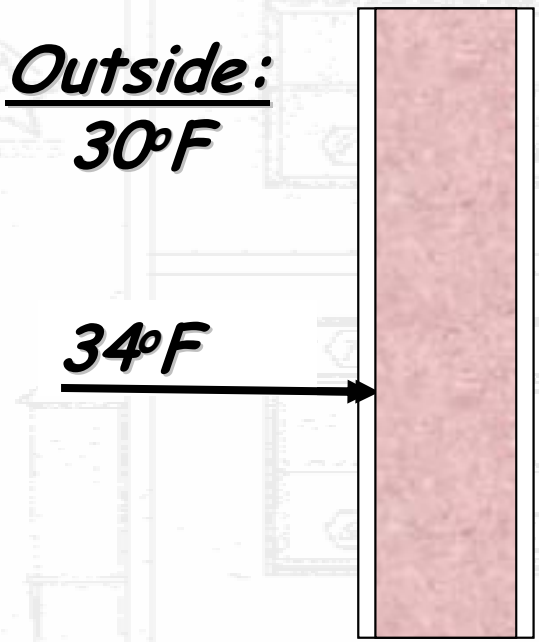
Air flow must be controlled to avoid moisture problems.

THE SCIENCE BEHIND THE VALUE

WHY CONTROL AIR FLOW

ENERGY STAR

With Insulation:



Inside:
70°F, 45°F Dew Pt.

Impact:

Insulated walls create cold surfaces.

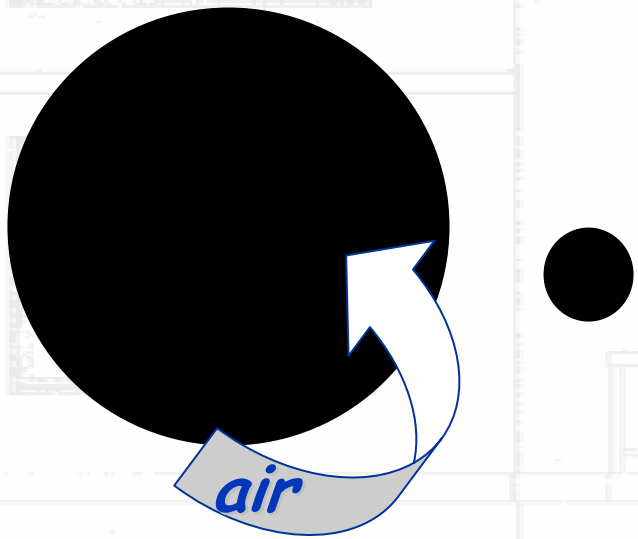
Insulated homes must be sealed tight to avoid moisture problems.

THE SCIENCE BEHIND THE VALUE

CONTROLLING AIR FLOW: RULE #1

ENERGY STAR

*Where there is a **driving force**, air will take the path of least resistance through largest hole.*



THE SCIENCE BEHIND THE VALUE

CONTROLLING AIR FLOW: RULE #2

ENERGY STAR

Driving Forces always move in predictable directions:

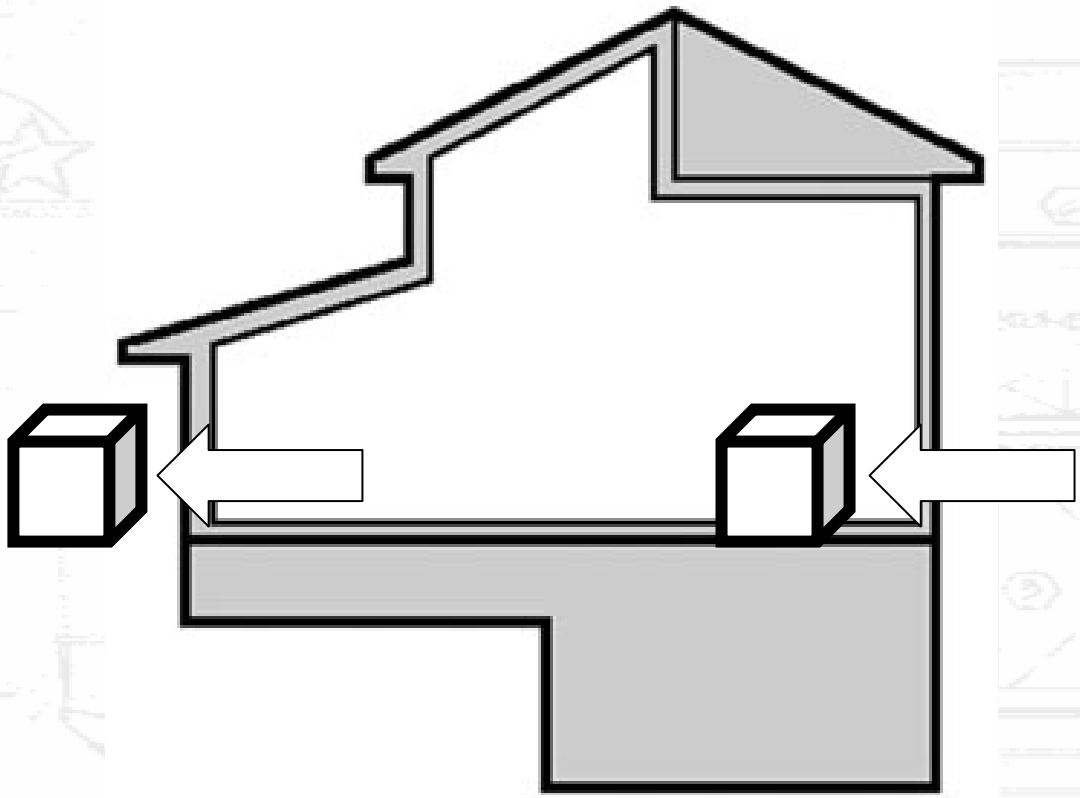
More Pressure		*Less Pressure*
More Moisture		*Less Moisture*
More Hot		*Less Hot*
(air and moisture)		

THE SCIENCE BEHIND THE VALUE

CONTROLLING AIR FLOW: RULE #3

ENERGY STAR

One Out = One In



Courtesy of Southface Institute

THE SCIENCE BEHIND THE VALUE

ONE OUT = ONE IN: CLOTHES DRYER

- *200 cfm*
- *60 minute cycle*
- *12,000 cubic feet out*
- *12,000 cubic feet in*

THE SCIENCE BEHIND THE VALUE

LOTS OF FANS/PRESSURES IN HOMES

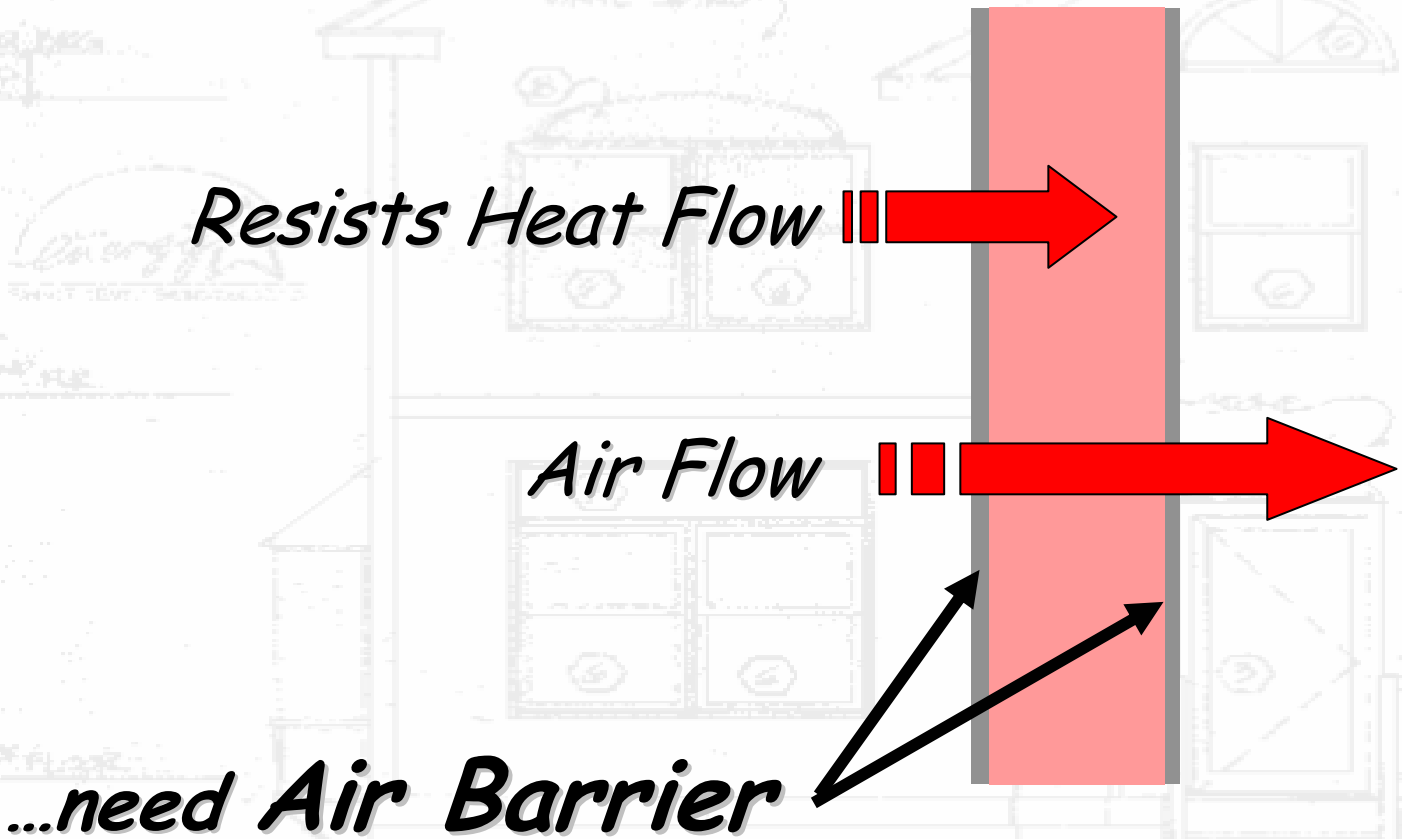
ENERGY STAR

- *Clothes Dryers* — *150 - 250 cfm*
- *Exhaust Fans*
  - *Bath* — *50 - 100 cfm*
  - *Kitchen* — *100 - 600+ cfm*
  - *Whole-House* — *~2,500 – 5,000+ cfm*
- *Central Vacuums* — *~100 cfm*
- *Fireplaces* — *up to 400 cfm*
- *Stack Affect* — *~15 - 30 cfm*

Simultaneous sources of exhaust adds up to 10,000's of cubic feet of Out and In

THE SCIENCE BEHIND THE VALUE

CONTROLLING AIR FLOW: INSULATION

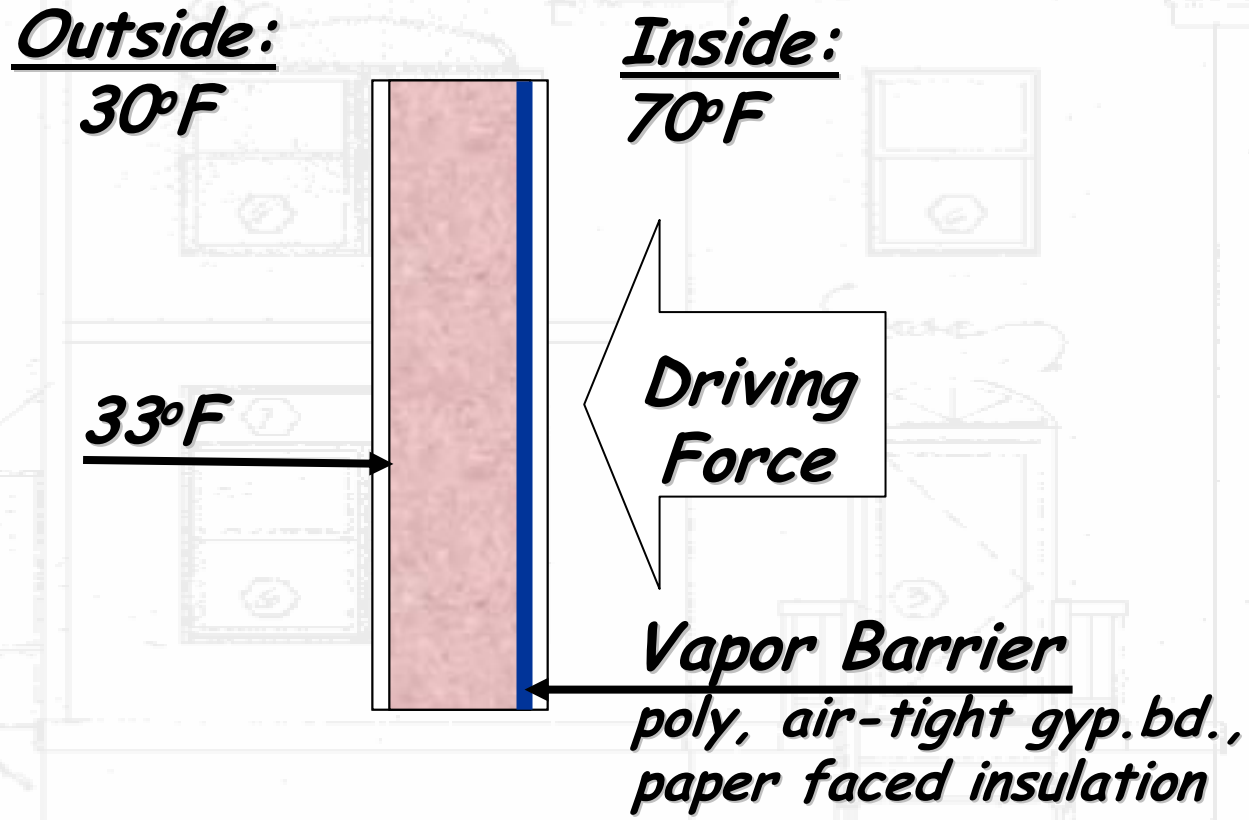


THE SCIENCE BEHIND THE VALUE

CONTROLLING MOISTURE FLOW

ENERGY STAR

Cold Climate:



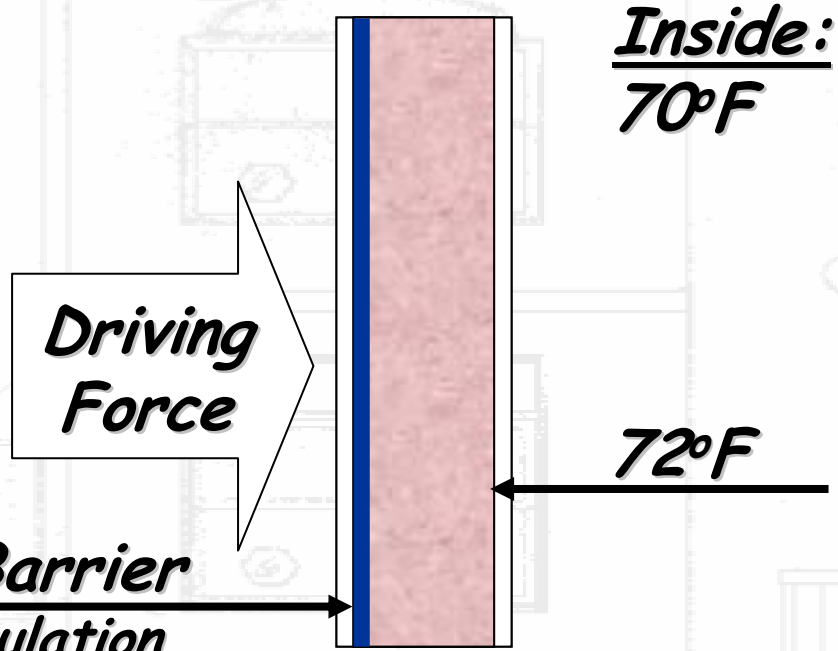
THE SCIENCE BEHIND THE VALUE

CONTROLLING MOISTURE FLOW

Hot-Humid Climate:

Outside:
85°F,

Inside:
70°F



Vapor Barrier
faced insulation,
faced sheathing,
unfaced insulation.

THE SCIENCE BEHIND THE VALUE

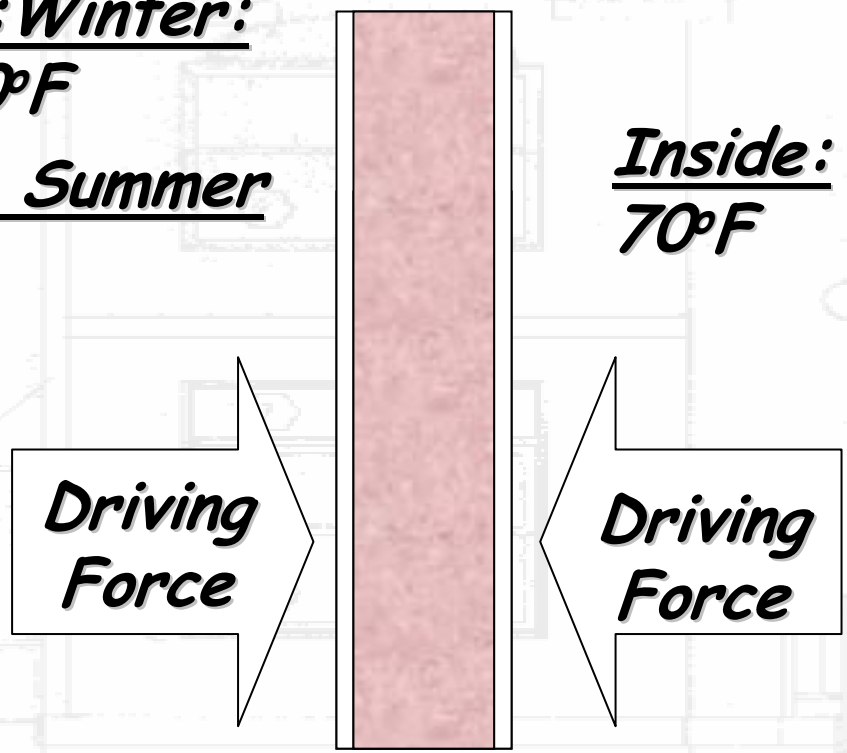
CONTROLLING MOISTURE FLOW

Mixed Climate:

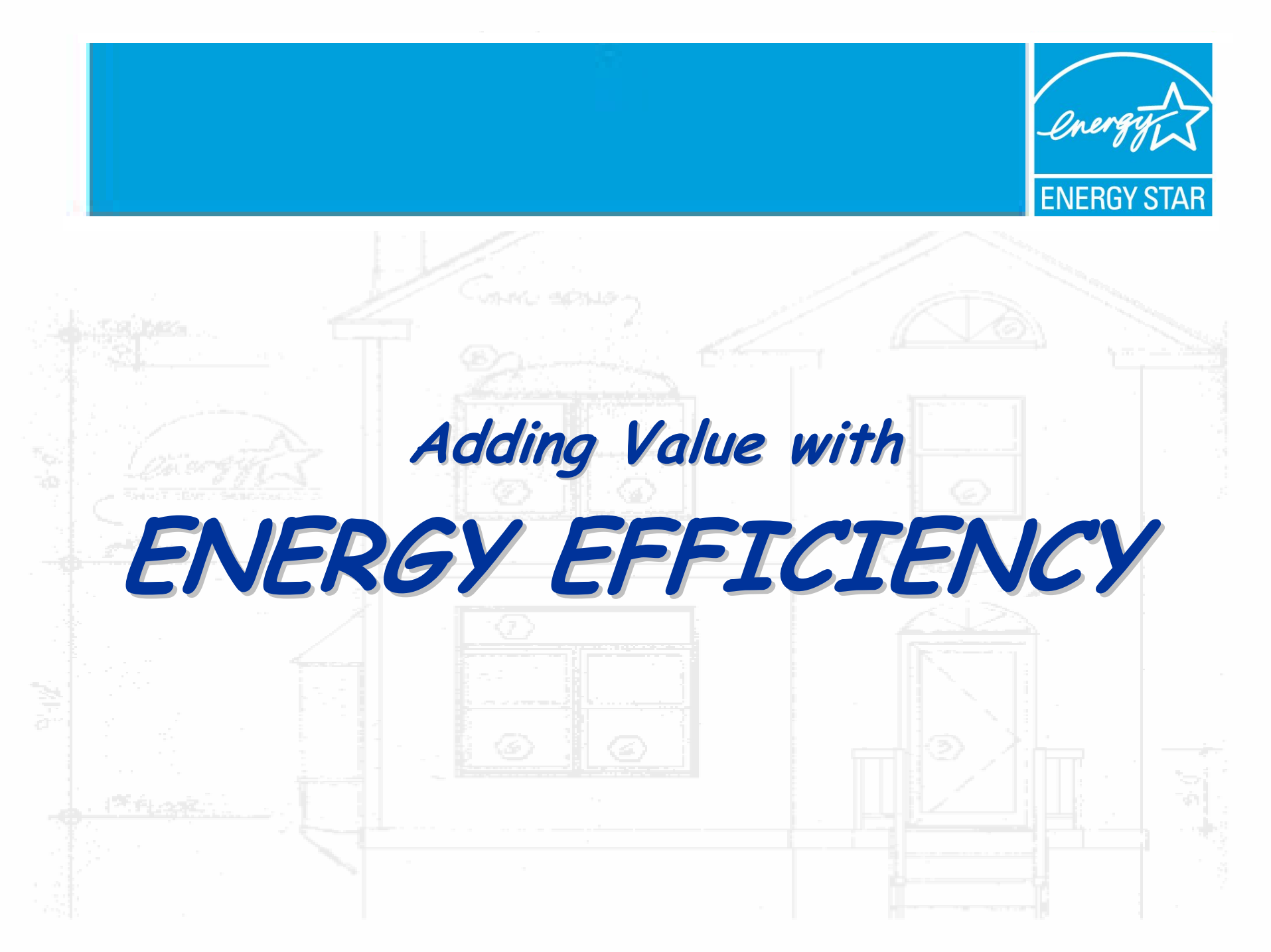
Outside: Winter:
30°F

Outside: Summer
85°F

Inside:
70°F



No Vapor Barrier on either side!


Adding Value with
ENERGY EFFICIENCY

ENERGY EFFICIENCY

WHAT IS ENERGY EFFICIENCY?

ENERGY STAR

Minimizing energy needed to control indoor environment and operate appliances and equipment.

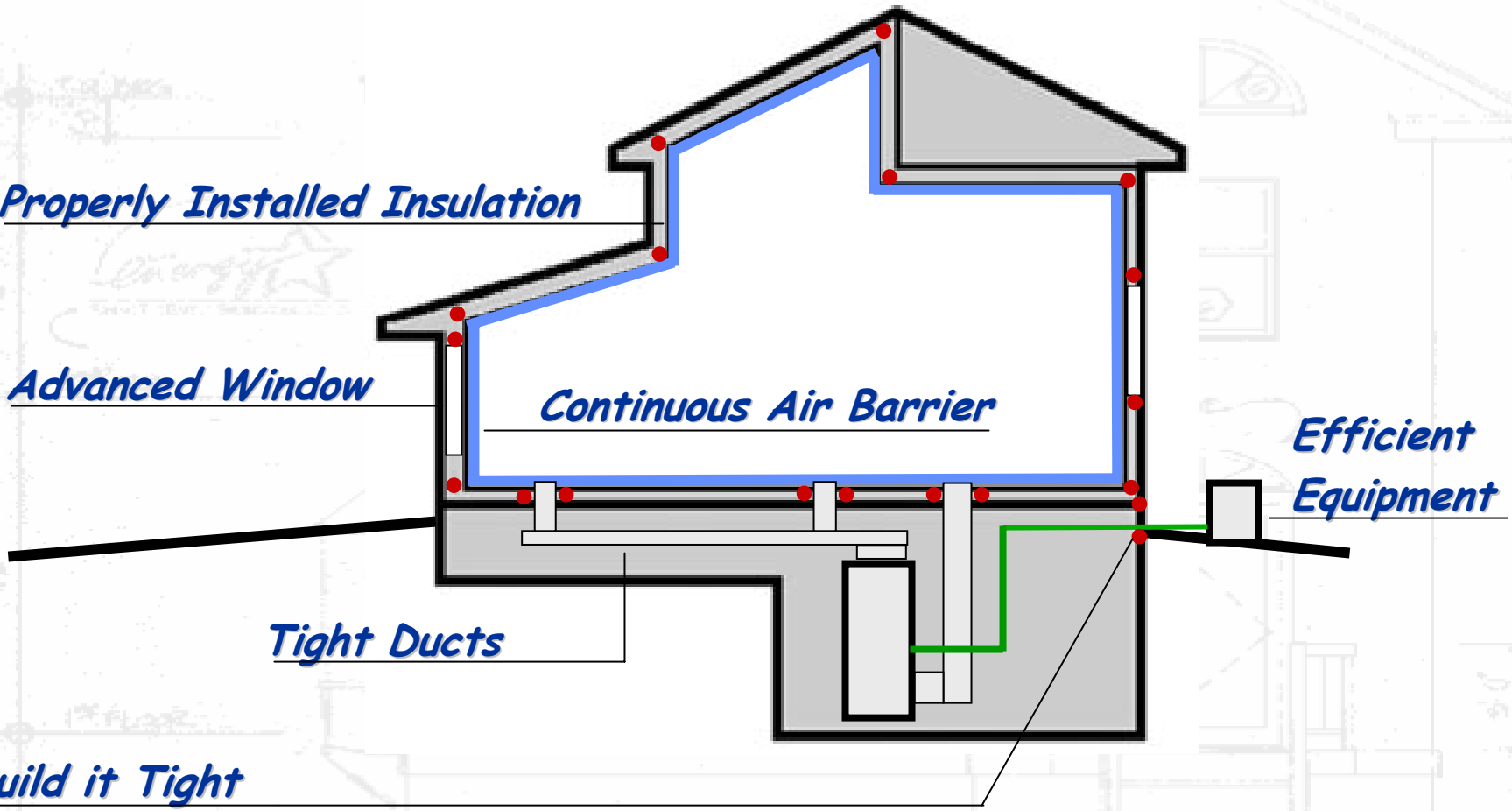
ENERGY EFFICIENCY

WHY ENERGY EFFICIENCY?

- *lower utility cost*
- *comfort*
- *health*
- *durability*
- *plus a better environment*

ENERGY EFFICIENCY

TYPICAL ENERGY EFFICIENT MEASURES



ENERGY EFFICIENCY

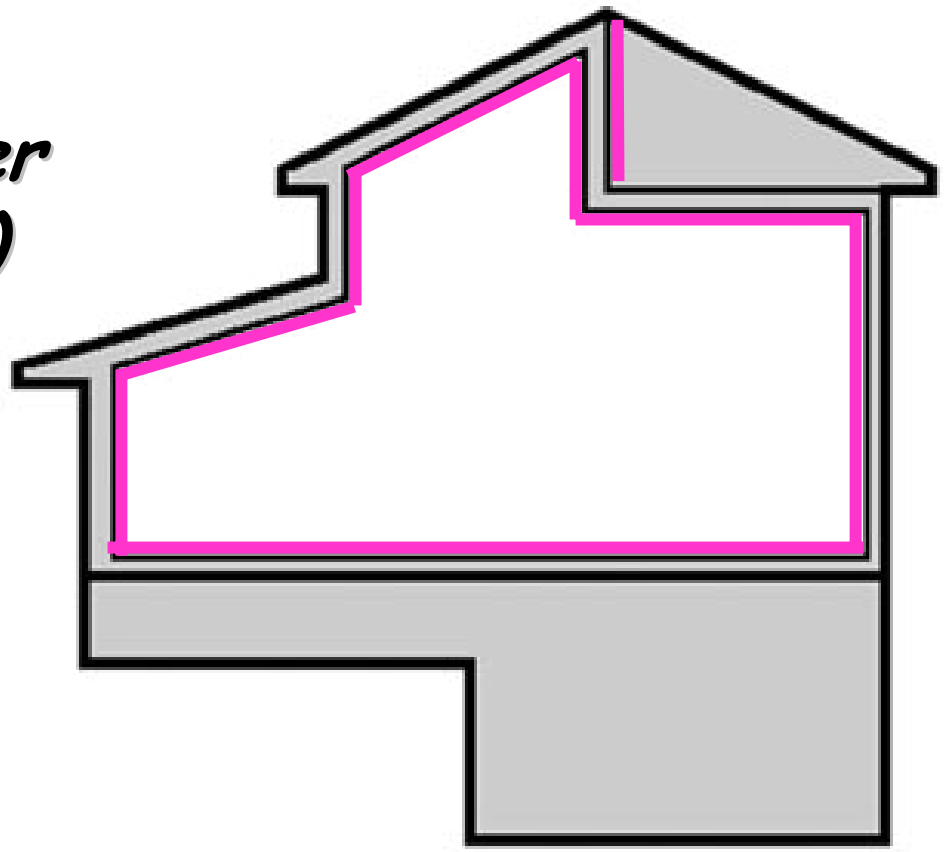
INSULATION: VALUE KILLERS

- ***Incomplete Air Barrier***
- ***Misalignment with Air Barrier***
- *Gaps*
- *Voids*
- *Compression*
- *Wind Intrusion*

ENERGY EFFICIENCY

ALIGN AIR AND THERMAL BARRIERS

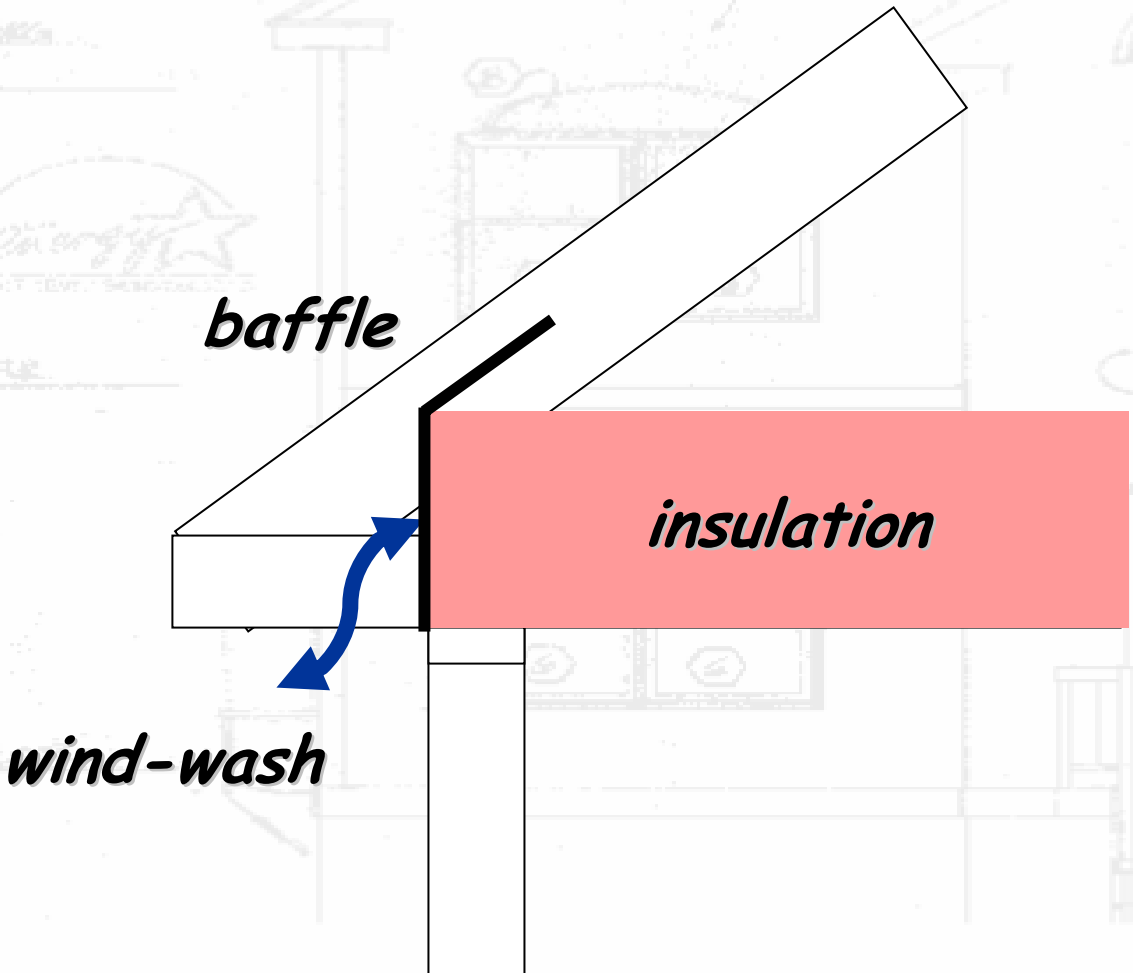
- *Continuous*
- *Full contact with interior air barrier (e.g., sheet rock)*
- *Fully enclose conditioned space*



Courtesy of Southface Institute

ENERGY EFFICIENCY

INSULATION: ATTIC AIR BARRIER



ENERGY EFFICIENCY

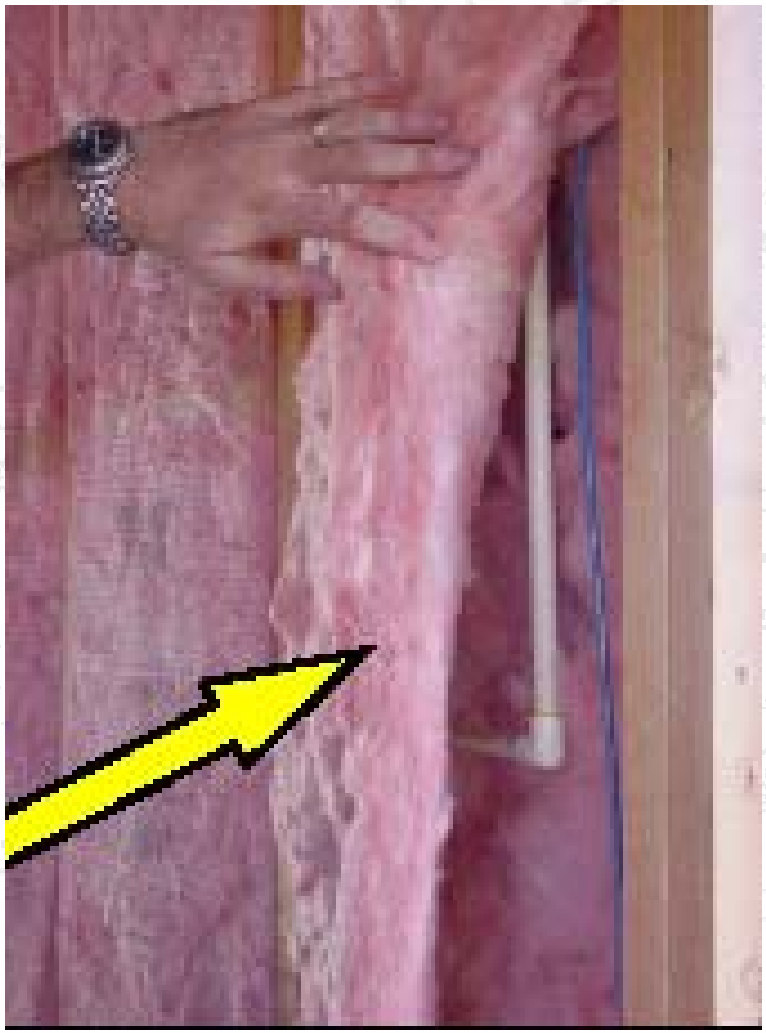
INSULATION: PROBLEMS

ENERGY EFFICIENCY

MISALIGNED AIR BARRIER/INSULATION

ENERGY EFFICIENCY

ALIGNED AIR BARRIER: FIBERGLASS



ENERGY EFFICIENCY

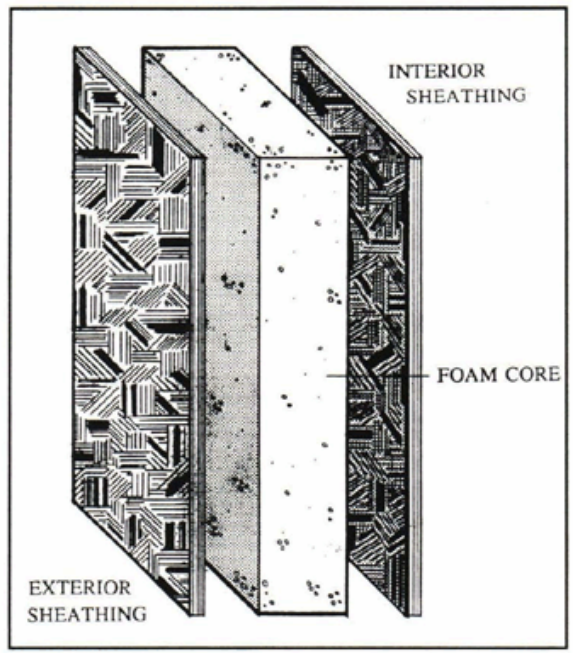
ALIGNED AIR BARRIER: CELLULOSE

ENERGY EFFICIENCY

ALIGNED AIR BARRIER: SPRAY FOAM

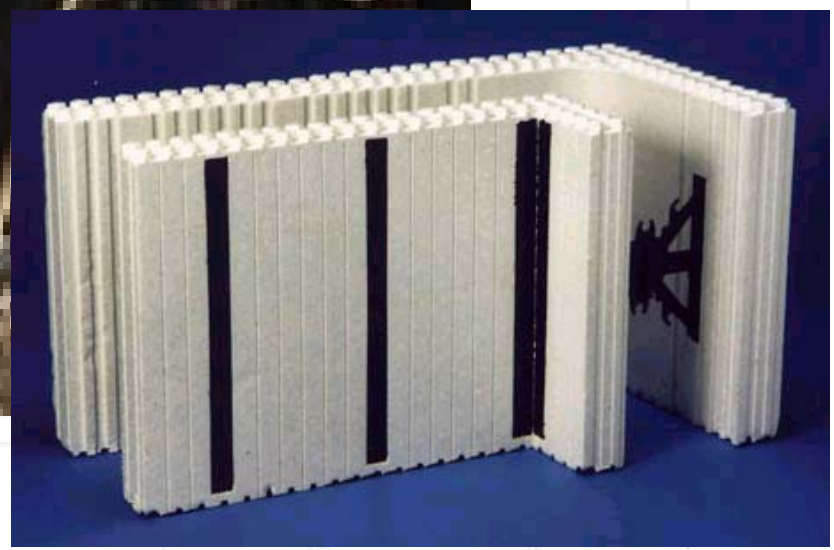
ENERGY EFFICIENCY

ALIGNED AIR BARRIER: SIP WALLS



ENERGY EFFICIENCY

ALIGNED AIR BARRIER: ICF WALLS



ENERGY EFFICIENCY

BEHIND TUB: INSULATION/AIR BARRIER

Courtesy of Building Science Corp.

ENERGY EFFICIENCY

BEHIND TUB: INSULATION/AIR BARRIER

Courtesy of Building Science Corp.

ENERGY EFFICIENCY

AIR BARRIER ALIGNMENT: KNEE WALL

Hot Wall

Courtesy of Building Science Corp.

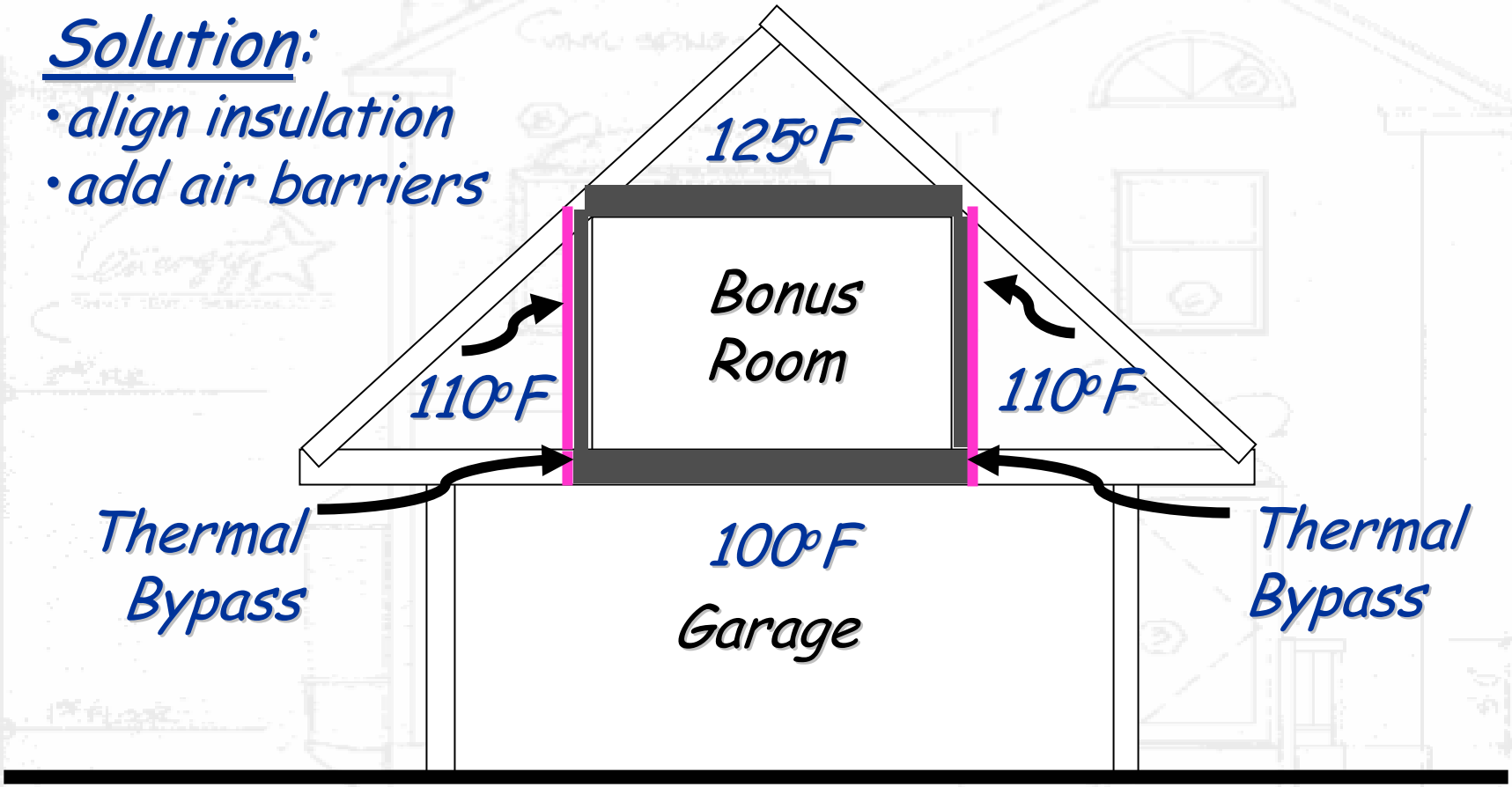
ENERGY EFFICIENCY

AIR BARRIER ALIGNMENT: BONUS ROOM

ENERGY STAR

Solution:

- *align insulation*
- *add air barriers*

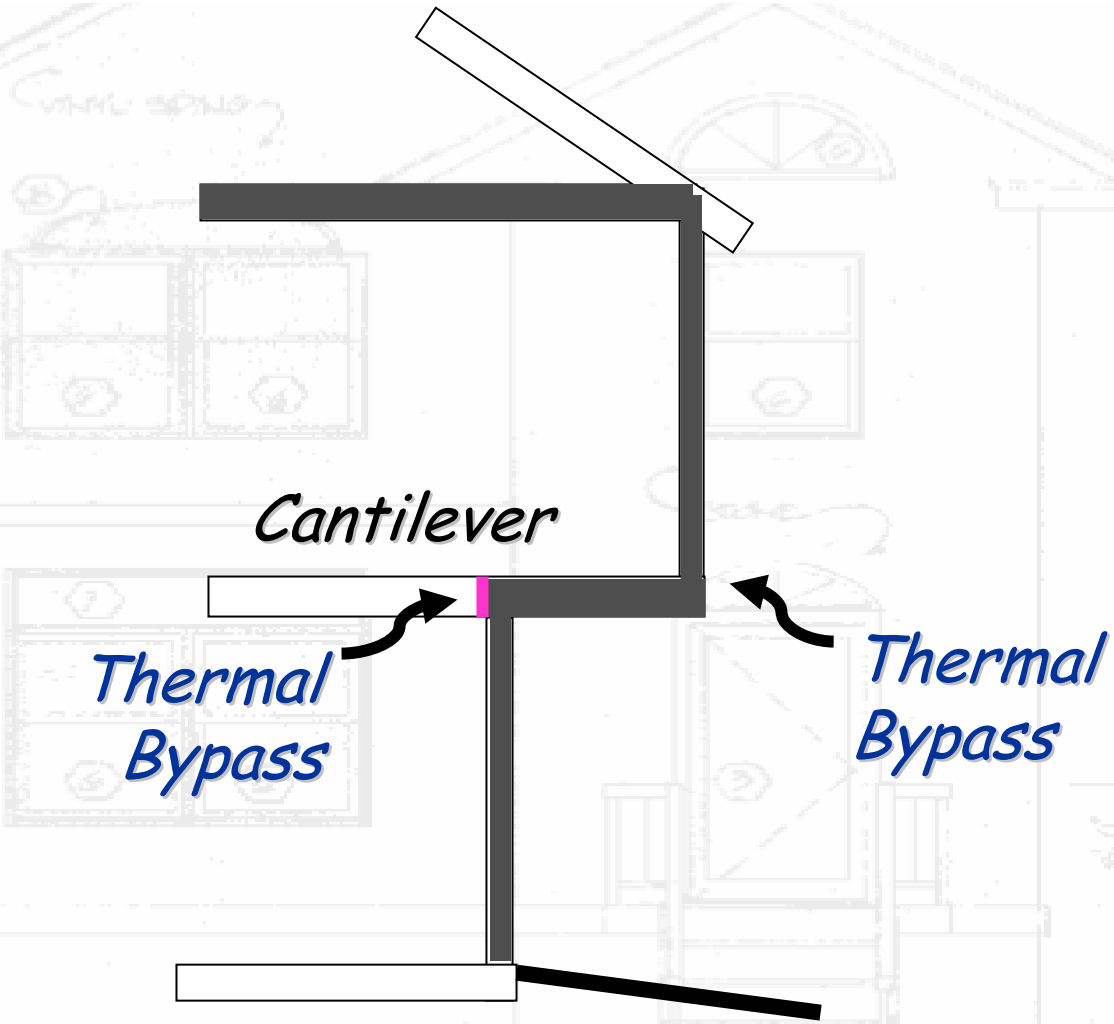


ENERGY EFFICIENCY

AIR BARRIER ALIGNMENT: CANTILEVER

Solution:

- *align insulation*
- *add air barriers*



ENERGY EFFICIENCY

NO AIR BARRIER AT DROPPED CEILING

Courtesy of Building Science Corp.

ENERGY EFFICIENCY

DROPPED CEILING AIR BARRIER

Courtesy of Building Science Corp.

ENERGY EFFICIENCY

CHIMNEY SHAFT AIR BARRIER

Courtesy of Building Science Corp.

ENERGY EFFICIENCY

ADVANCED FRAMING: WHAT AND WHY

ENERGY STAR

WHAT:

- Providing only framing needed for structural integrity

WHY:

- Allow more insulation
- Save money on wood

ENERGY EFFICIENCY

ADVANCED FRAMING: PROBLEM

ENERGY STAR

Where 4 is good;

5 must be better;

and 9 is Great!

Courtesy of Building Science Corp.

ENERGY EFFICIENCY

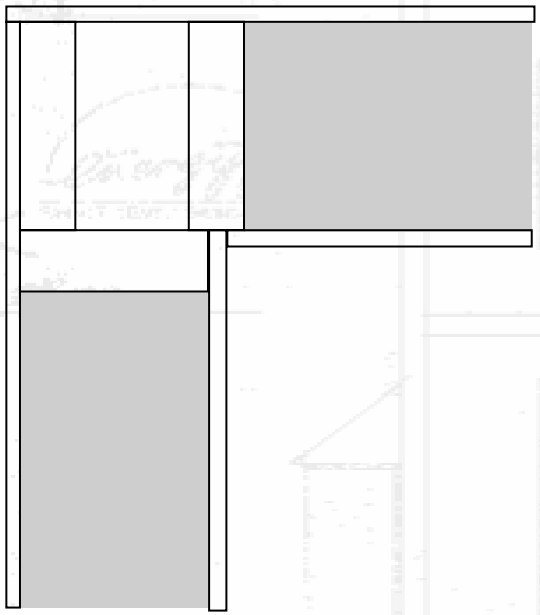
ADVANCED FRAMING: BAD/GOOD

Courtesy of Building Science Corp.

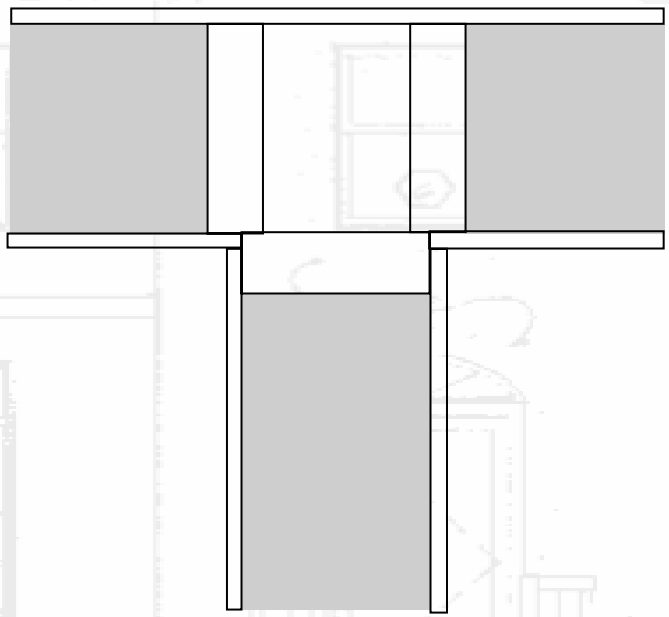
ENERGY EFFICIENCY

ADVANCED FRAMING: PROBLEM

uninsulated corner



uninsulated wall intersection



Uninsulated corners and walls in typical framed home added up to a 70 square foot thermal hole!

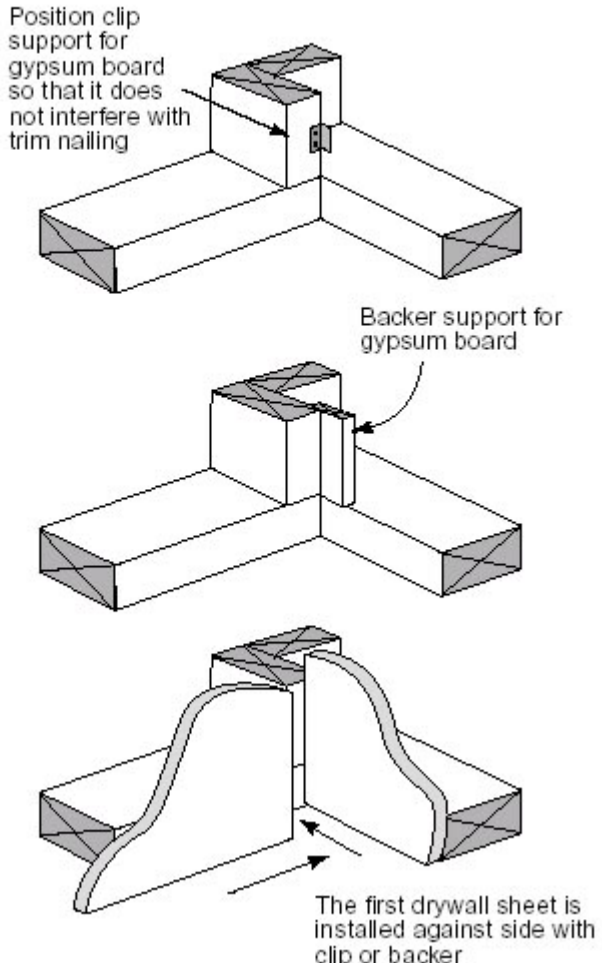
ENERGY EFFICIENCY

ADVANCED FRAMING: SOLUTIONS

Courtesy of Building Science Corp.

Courtesy of Southface Institute

INSIDE "TWO-STUD" CORNERS



ENERGY EFFICIENCY

ADVANCED FRAMING: SOLUTIONS

Ladder T – Allows insulation in exterior wall cavity at wall intersections

ENERGY EFFICIENCY

TIGHT CONSTRUCTION: WHY?

- ***Eliminate unwanted heat loss/gain***
- ***Eliminate potential moisture problems***
  by avoiding humid air flow through construction assemblies
- ***Eliminate outdoor pollutants***
  (e.g., humidity, dust, pollen)

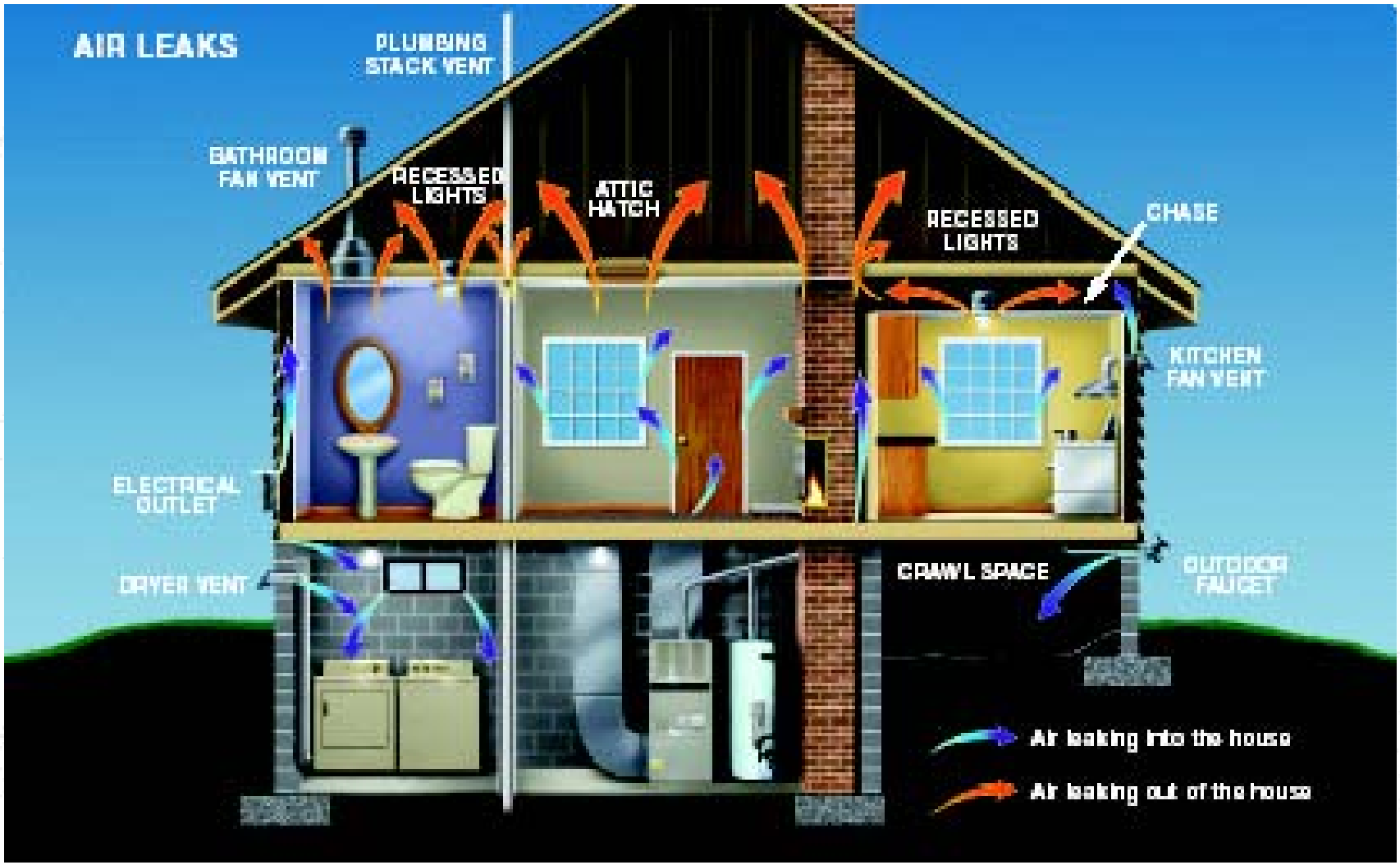
ENERGY EFFICIENCY

TIGHT CONSTRUCTION: HOW?

- ***Seal Un-designed Holes***
  - *Cracks*
  - *Holes*
  - *Shafts*
- ***Control Air Flow with Designed Holes***
  - *Mechanical Ventilation*
  - *Exhaust Fans*
  - *Pressure Balancing*

ENERGY EFFICIENCY

TIGHT CONSTRUCTION: HOLES/CRACKS



ENERGY EFFICIENCY

FLOOR SILL PLATE LEAKAGE

Courtesy of Building Science Corp.

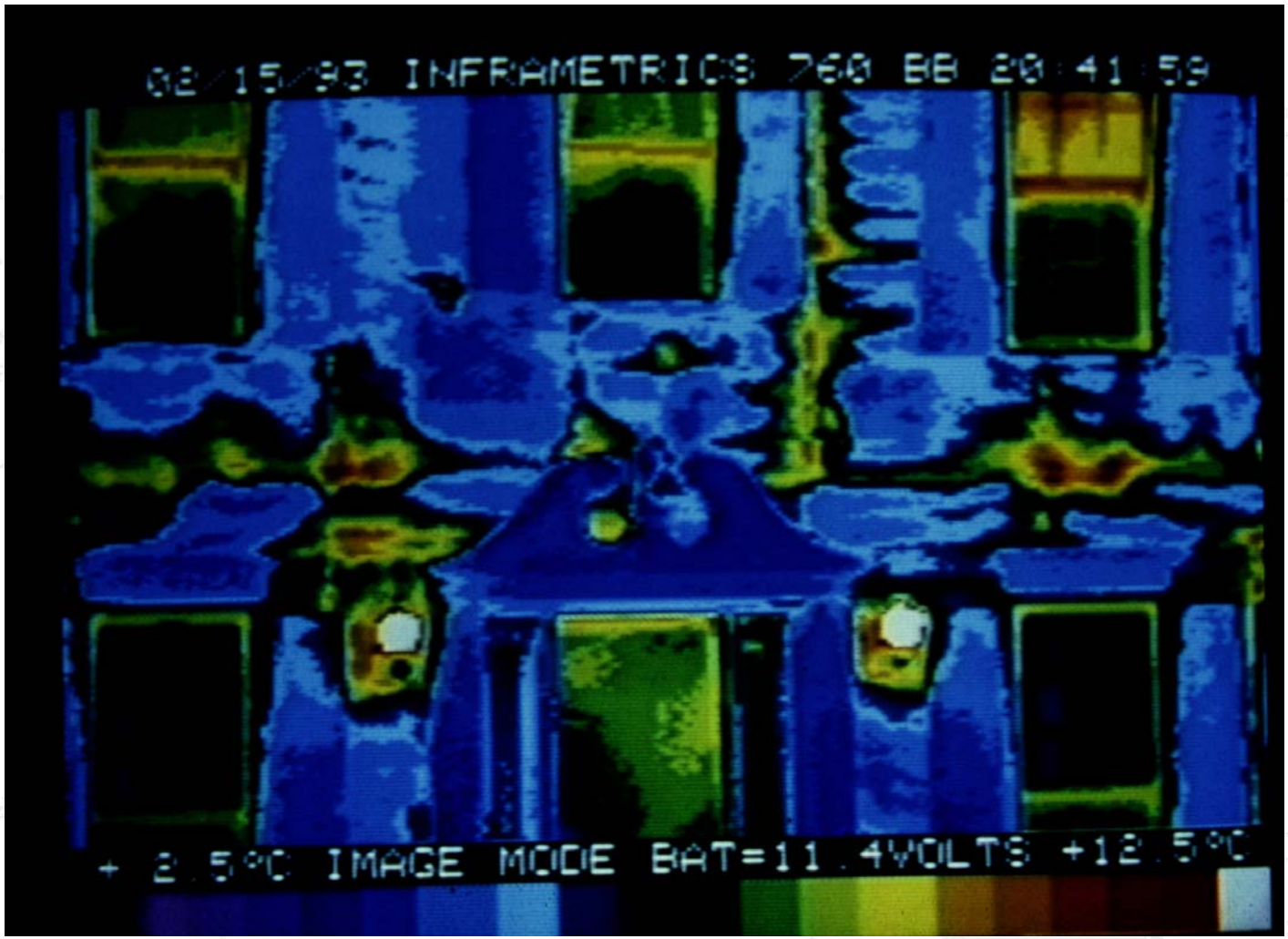
ENERGY EFFICIENCY

FLOOR SILL PLATE SEALING

Courtesy of Building Science Corp.

ENERGY EFFICIENCY

WINDOWS AND DOORS LEAKAGE



Courtesy of Building Science Corp.

ENERGY EFFICIENCY

WINDOW SEALING

ENERGY STAR

ENERGY EFFICIENCY

PLUMBING/ELECTRIC PENETRATIONS

ENERGY EFFICIENCY

PLULMBING PENETRATION SEALING

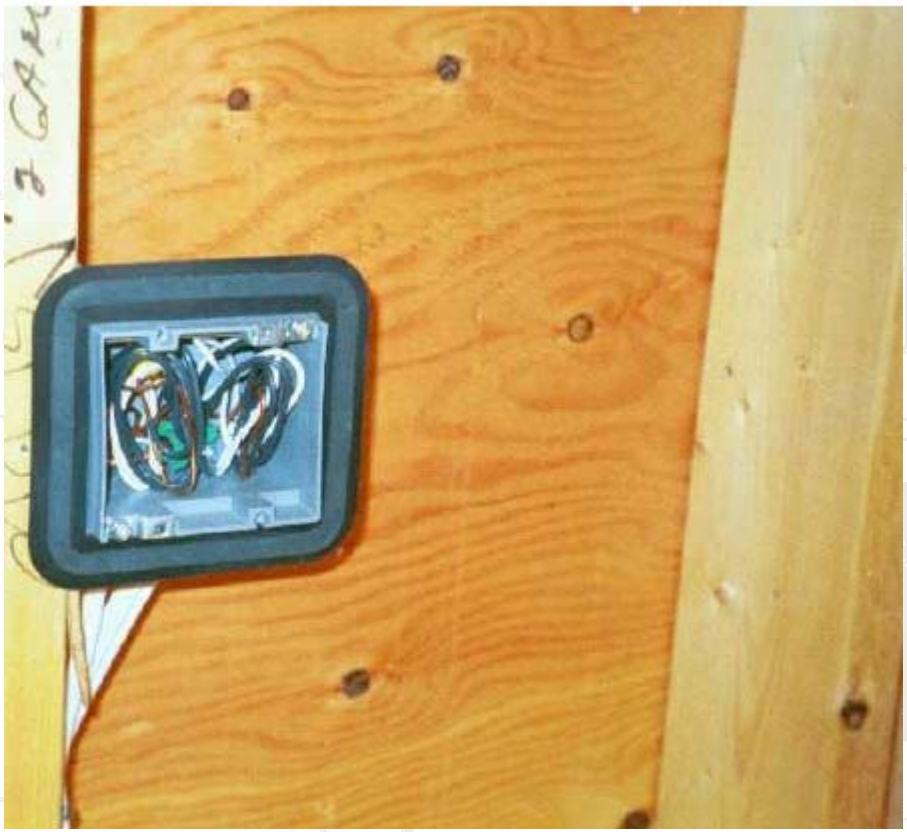
Courtesy of Building Science Corp.

ENERGY EFFICIENCY

ELECTRIC PENETRATION SEALING

ENERGY EFFICIENCY

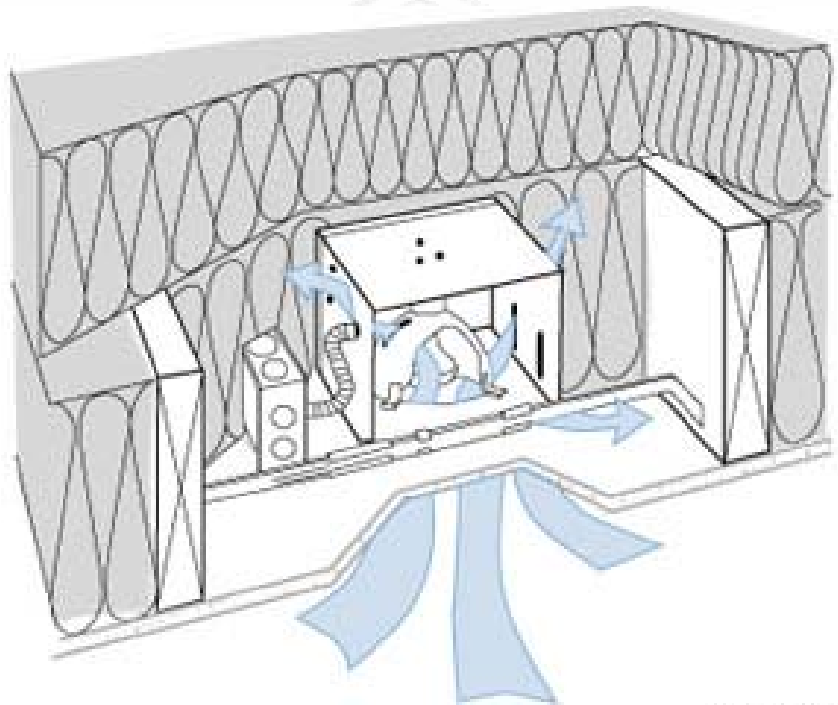
ELECTRICAL OUTLET SEALING



Courtesy of Building Science Corp.

ENERGY EFFICIENCY

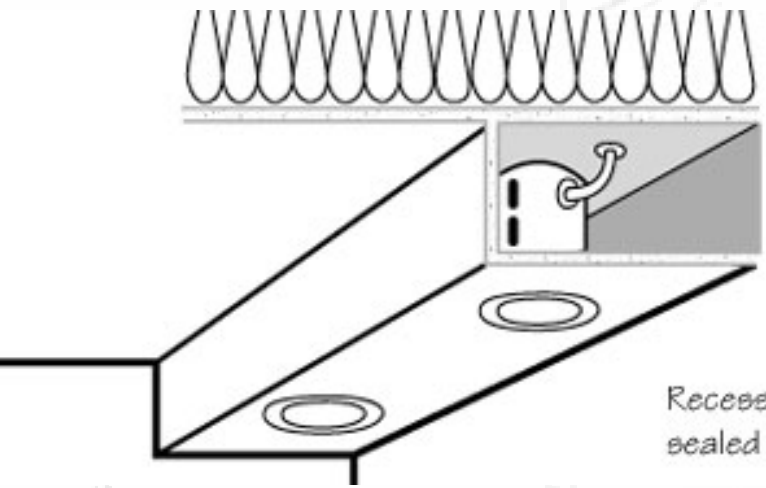
RECESSED LIGHTING AIR LEAKAGE



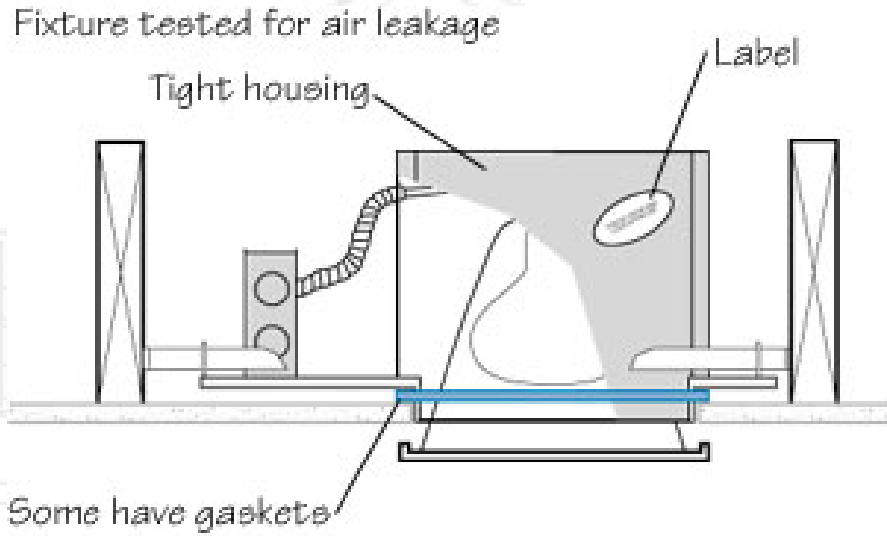
Even when covered with insulation recessed lights pump conditioned air out of the house.

ENERGY EFFICIENCY

RECESSED LIGHTING AIR LEAKAGE



Recessed fixture in a sealed soffit



Eliminate this air leakage by locating fixtures inside the insulated envelope or using insulated can, air-tight (ICAT) recessed fixtures.

ENERGY EFFICIENCY

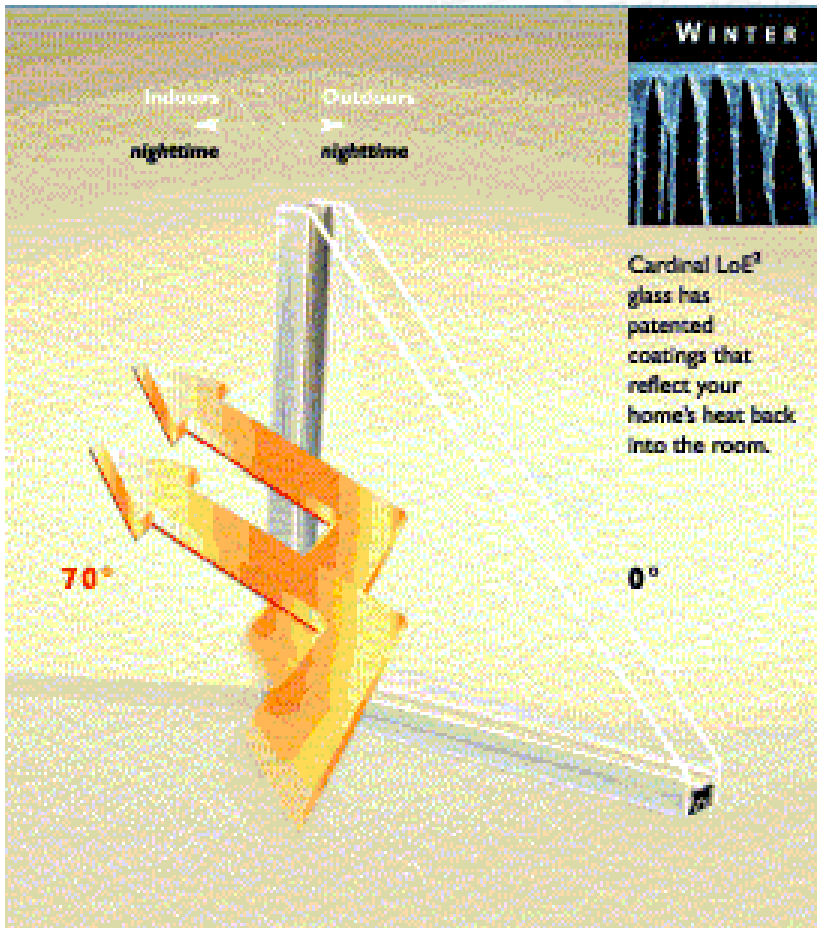
DUCT SHAFT LEAKAGE

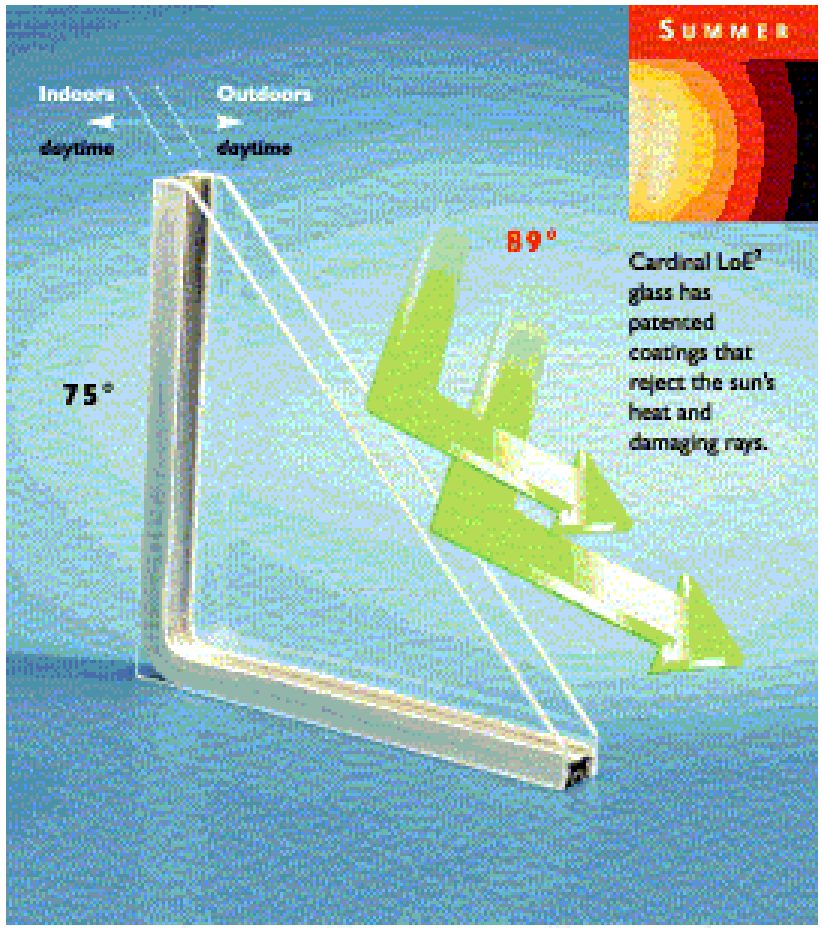
Courtesy of Building Science Corp.

ENERGY EFFICIENCY

LOW-E WINDOWS

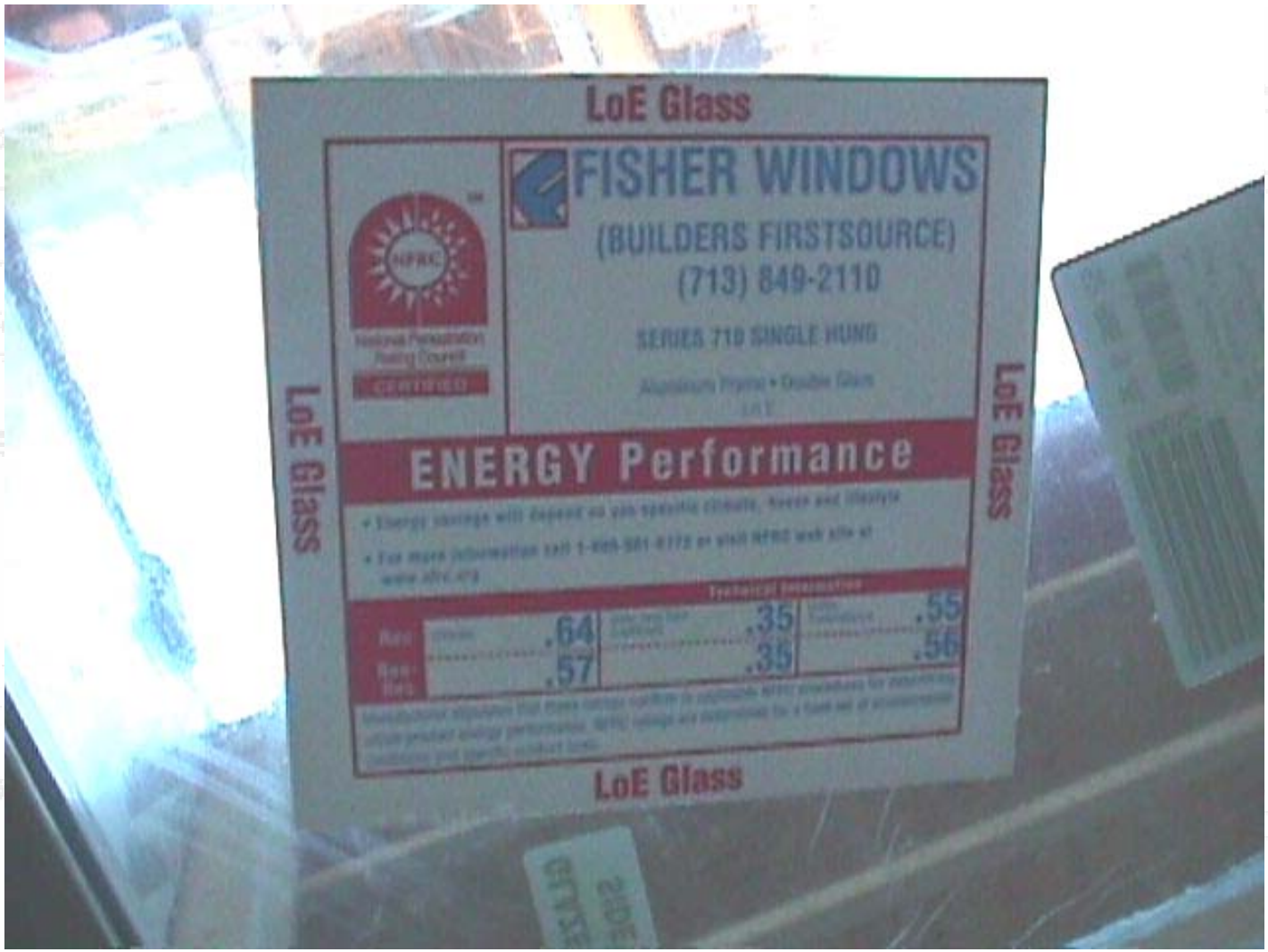
ENERGY STAR





ENERGY EFFICIENCY

LOW-E WINDOWS: NFRC LABEL



ENERGY EFFICIENCY

LOW-E WINDOWS

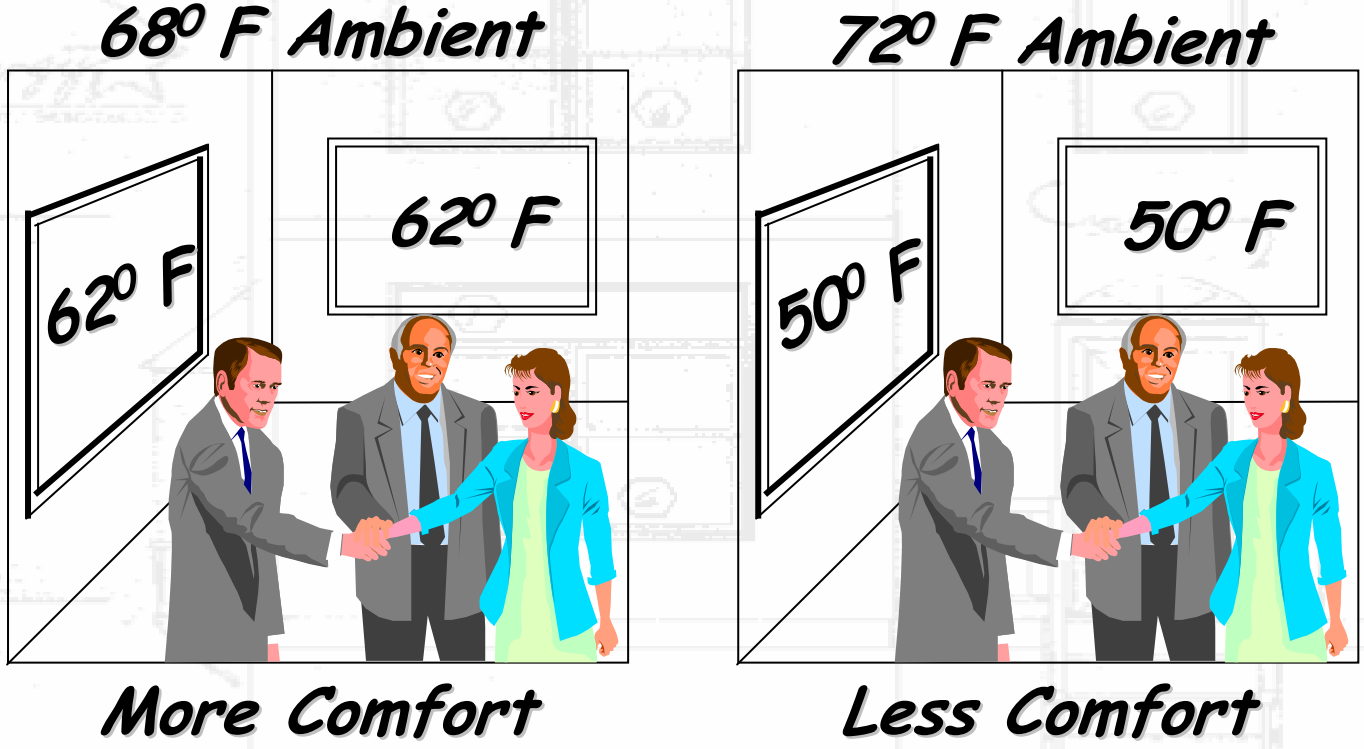
Windows with Low E coating on incorrect surface are marked "FLIP"

Courtesy of DR Wastchak, L.L.C.

ENERGY EFFICIENCY

LOW-E WINDOWS AND COMFORT

Mean Radiant Temperature (MRT) has 40% more impact than ambient temperature

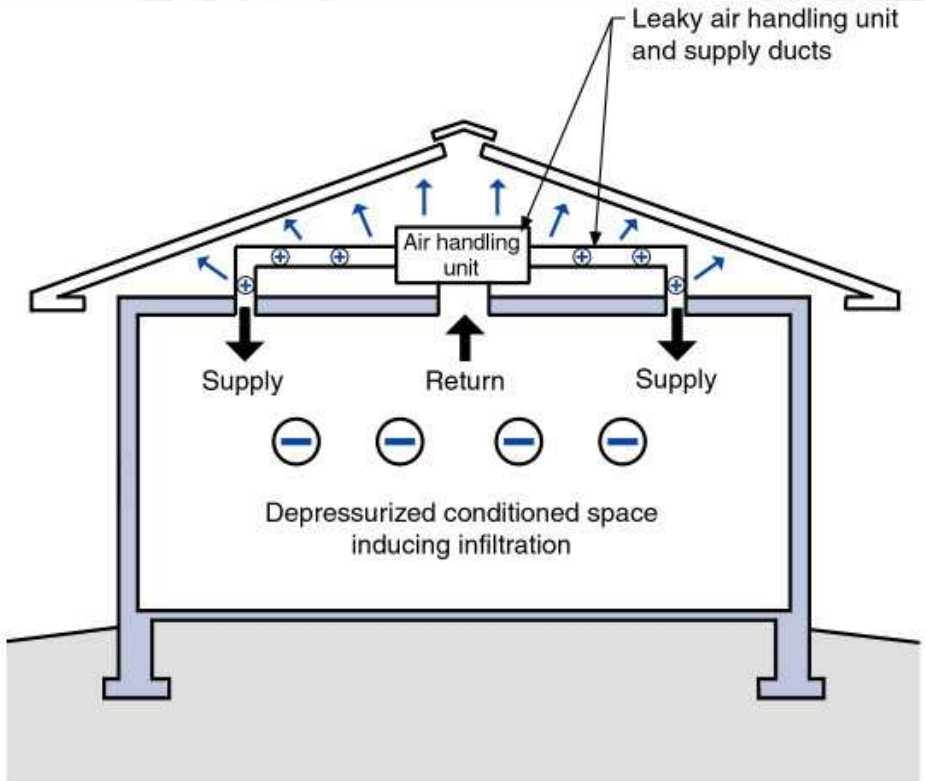


ENERGY EFFICIENCY

LOW-E WINDOWS AND DURABILITY

ENERGY EFFICIENCY

SEALING DUCTS: PROBLEMS



Courtesy of Building Science Corp.

ENERGY EFFICIENCY

ENERGY EFFICIENT DUCTS

- *Ducts Sized with ACCA Manual D*
- *Seal With Mastic*
- *Insulate*
- *Avoid Using Building Cavities as Ducts*
- *Get it Inside if Possible*

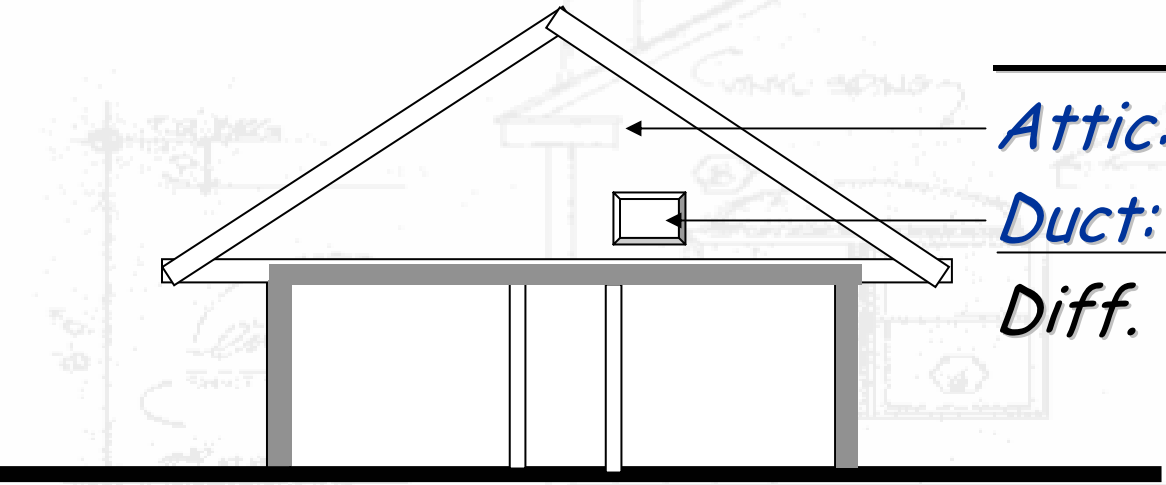
ENERGY EFFICIENCY

SEALING DUCTS WITH MASTIC

Courtesy of Building Science Corp.

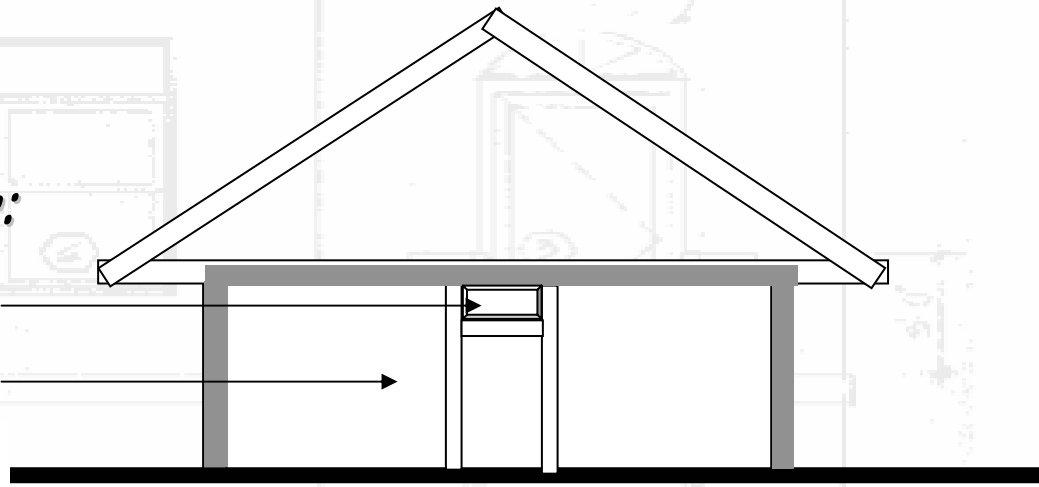
ENERGY EFFICIENCY

ATTIC VS. INTERNAL DUCTS



	Summer:	Winter:
Attic:	140°F	20°F
Duct:	55°F	105°F
Diff.	85°F	85°F

	Summer:	Winter:
Duct:	55°F	105°F
House	70°F	70°F
Diff.	25°F	35°F



ENERGY EFFICIENCY

ENERGY EFFICIENT EQUIPMENT

Heating:

- Super Efficiency: 90+ AFUE
- Direct Vent

Cooling:

- 13 SEER
- Multi-Speed

Air Handler:

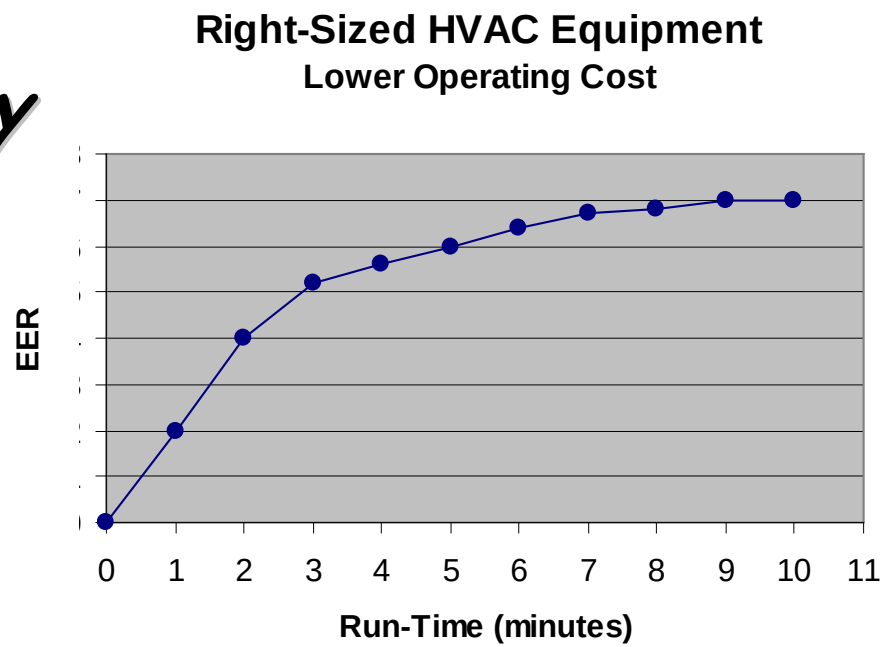
- Variable Speed Blower Motor
- Air-Tight Cabinet

ENERGY EFFICIENCY

EQUIPMENT RIGHT-SIZING

Benefits:

- Lower Cost
- Increased Efficiency
- Longer Lifetime
- Better Moisture Control
- Improved Comfort.



ENERGY EFFICIENCY

ENERGY STAR DIAGNOSTICS

A Blower Door is an Instrument used to Measure Air Leakage in the Building Envelope.

ENERGY EFFICIENCY

ENERGY STAR DIAGNOSTICS

A Duct Blaster is an Instrument used to Measure the Leakiness of Ducts.

ENERGY EFFICIENCY

PERFORMANCE ADVANTAGE

Unless you're prepared to break the laws of physics, energy efficiency delivers:

- *Lower Utility Costs*
- *More Comfort*
- *More Durability*
- *Improved Indoor Air Quality*
- *Environmental Protection*

ENERGY EFFICIENCY

COST DEBITS AND CREDITS

Additional Debit		Additional Credit	
Low-E Windows	$500	Right-Sized AC	($500 - $800)
Air Sealing	$250	Reduced # AC	($500 - $1,000)
Tight Ducts	$250	Compact Ducts	($200 - $400)
Effective Insulation	$400	Reduced Framing	($200 - $400)
High-Eff. Equip.	$600	Eliminate Furnace	($ 0 - $500)
	~$2,000		vs. ($1,500-$2,000)

ENERGY EFFICIENCY

VALUE: CASH-FLOW

~$2,500 over 7-8 years average home ownership

	Monthly	Before Tax Annual	After Tax Annual
Utility Savings	$35*	$420	$420
Added Mortgage	$15**	$180	$120
Cost Savings	**$20**	**$240**	**$300**

* Likely to increase while mortgage remains fixed

** Based on $2,000 additional price for energy efficient

ENERGY EFFICIENCY

MORE VALUE

- ***Investment Return***

  example: $2,000 cash purchase for additional energy additional energy features yields ~35%+ IRR (after taxes) over average 8 years of ownership

- ***Lower Maintenance Cost***

  - avoided moisture damage
  - low-E windows reduced damage to furnishings
  - longer-lived equipment

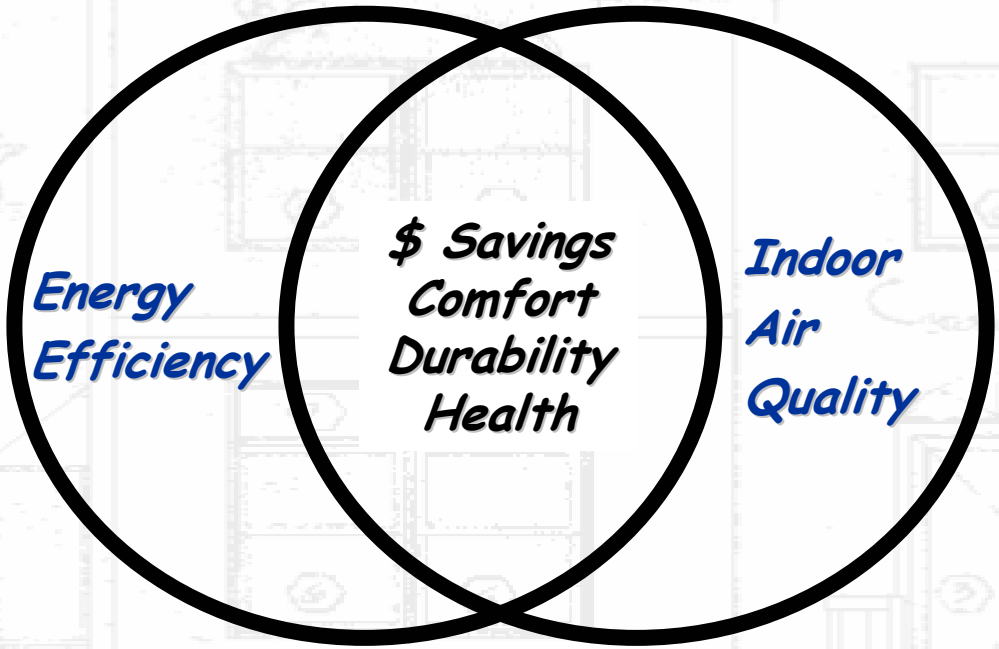
- ***Higher Resale Value***

  - track record of low bills
  - reduced obsolescence
  - government-backed label for high-performance

APPRAISING OPTIONS

ENERGY STAR VALUE PROPOSITION

ENERGY STAR for Homes



ENERGY STAR with INDOOR AIR PACKAGE

APPRAISING OPTIONS

CONDITIONS AFFECTING VALUE

- ***High Utility Bills***
- ***Comfort Problems***
  - *Cold/Warm Drafts*
  - *Unevenly Conditioned Rooms*
  - *Musty Smell*
- ***Durability Problems***
  - *Peeling Exterior Paint*
  - *Presence of Mold*
  - *Wet Basements*
  - *Wet Stains on Walls/Ceilings*
  - *Ice Dams in Winter*

APPRAISING OPTIONS

APPRAISING VALUE OF IMPROVEMENTS

Before: ~$2,500/yr.

- *1320 square feet*
- *198 million BTUs/year*
- *6,000 kWh/year*

After: ~$1,100/yr.

- *2030 square feet*
- *85 million BTUs/year*
- *3,000 kWh/year*

*With a 50% **increase** in square footage…*
*Almost 60% **reduction** in utility costs*
$11,000+ savings over 8 years!

APPRAISING OPTIONS

OPTIONS FOR CONSIDERING VALUE…

- *Determine value for ENERGY STAR label for Homes based on sales comparison ('Comps')*
- *Calculated or Actual Utility Bill Savings (HERS Rating or ENERGY STAR BOP):*
  - Monthly Energy Savings
  - Present Value of Energy Savings
- *Cost of energy efficiency improvements added based on table of values by measure*
- *Cost to Fix Failures*

APPRAISING OPTIONS

RECOMMENDED IMMEDIATE ACTIONS

- **"Energy Efficient Items"**
  - Assign value for ENERGY STAR Label; or
  - Use cost of energy improvements; or
  - Use present value of energy savings.

- **"Condition"**
  - Use cost of improvements; or
  - Use estimated cost to fix failures; and
  - stay tuned for ENERGY STAR with INDOOR AIR PACKAGE

MORE INFORMATION ON ENERGY STAR

On the Web at:

http://www.energystar.gov/homes