

Nebraska's Energy Code

2018 IECC and Basic Building Science

Nebraska Energy Code Training Program

Instructor: Matt Belcher

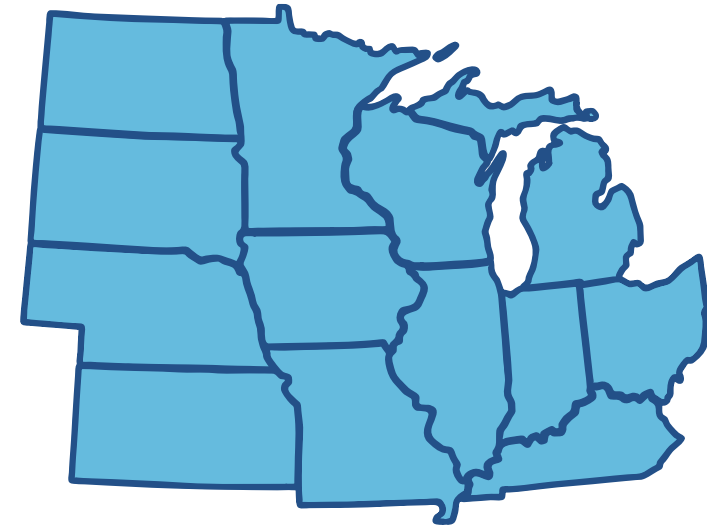
April 25, 2023



Midwest Energy Efficiency Alliance

The Midwest Energy Efficiency Alliance (MEEA) is a collaborative network, promoting energy efficiency to optimize energy generation, reduce consumption, create jobs and decrease carbon emissions in all Midwest communities.

MEEA is a non-profit membership organization with 150+ members, including:



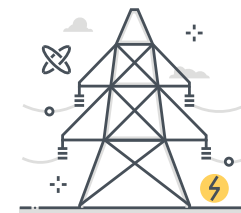
Energy service
companies &
contractors



State & local
governments



Academic &
research institutions



Electric &
gas utilities

About the Nebraska Training Program

- Goal: prepare the Nebraska workforce for upcoming changes in construction best practices
 - Residential and Commercial Energy Code
 - Building Science
 - Practical Solutions
- Focused on providing training to builders, code officials, design professionals, public officials and students
- For more information, visit:
<https://www.mwalliance.org/nebraska-energy-codes-training-program>



Training Objectives

- What is the 2018 Energy Code?
- Inside the Energy Code:
 - Building Envelope
 - Interior Comfort/Health
 - Remodeling/Rehab
 - Local Application/Amendments
- '21 Code → '24 National Standard
- Marketing Energy Efficient/High Performance Buildings





Nebraska's New Energy Code

- Nebraska adopted the full suite of 2018 International Code Council's (ICC) Codes, including the unamended International Energy Conservation Code (IECC)
- The IECC...
 - Applies to new and renovated buildings
 - Sets minimum requirements for energy features and performance
 - Reduces energy use and polluting emissions over the life of complying buildings
 - Benefits commercial building owner, homeowners, and society by improving cost-effectiveness, comfort, productivity, and durability
- The IECC covers both residential and commercial buildings, but we are focused on commercial today

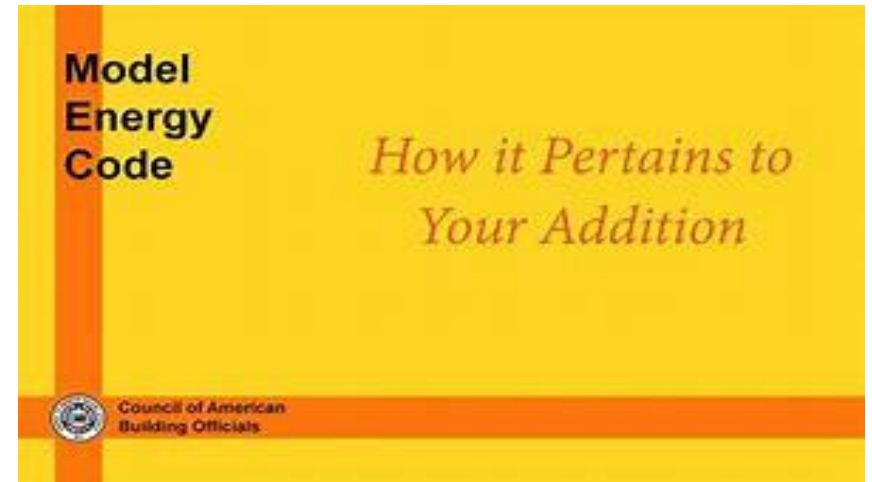


The 2018 IECC

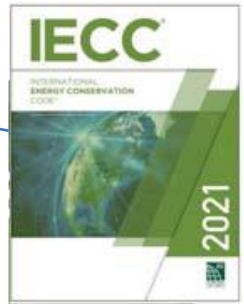
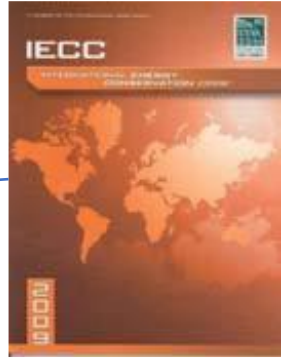
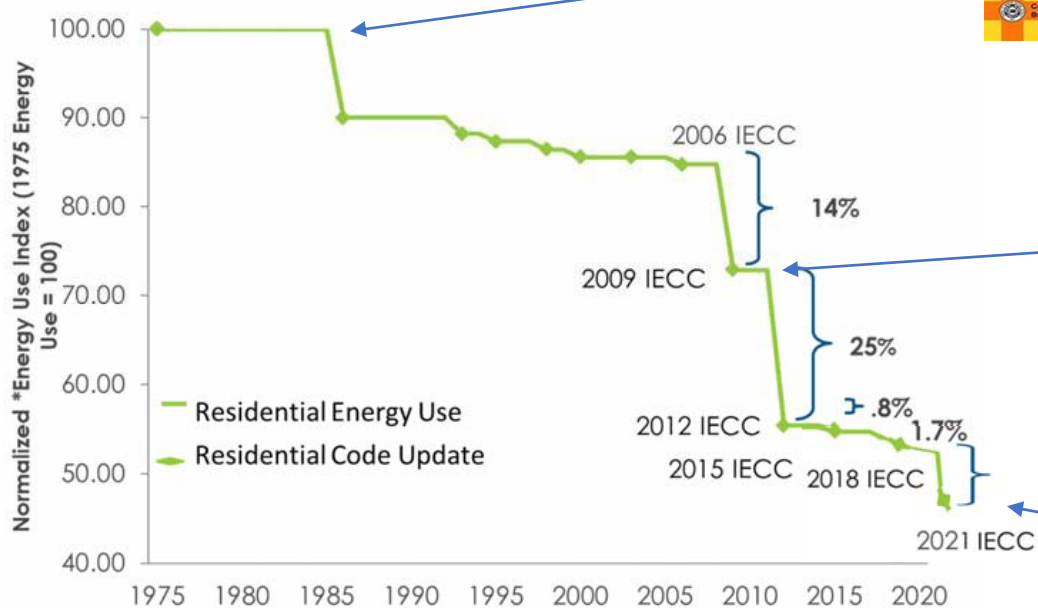
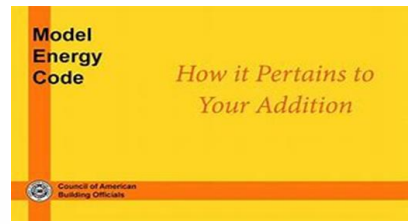


The Energy Code

- Model Energy Code (MEC) developed in 1983 under a U.S. Dept of Energy Contract
- Editions of the MEC released from 1983-1995
- Title changed to International Energy Conservation Code in 1998



Energy Code Background



Nebraska Residential Field Study

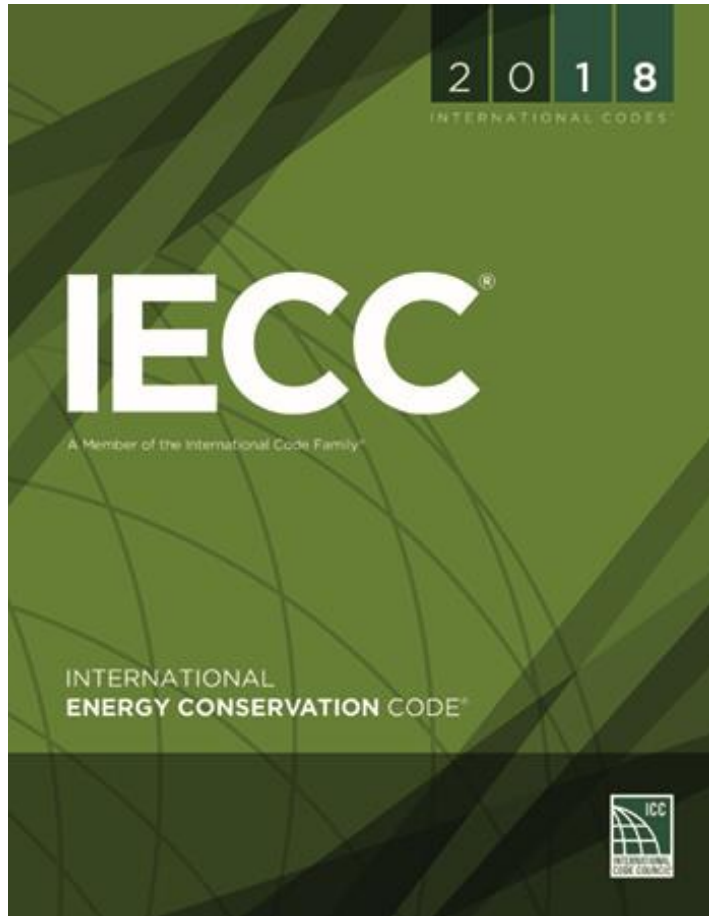
- Conducted in 2017 using the 2009 IECC as the baseline.
- Collected and analyzed several data points for new homes, including:
 - Envelope air leakage
 - Efficacy in lighting
 - Duct leakage
 - Ceiling & exterior wall insulation
 - Basement & slab insulation
 - Windows

For More Information and Data:

https://www.energycodes.gov/sites/default/files/documents/Nebraska_Residential_Compliance_Evaluation_final.pdf



So, What's Changed Since 2009?



2018 IECC / IRC Section 11

- Creates a Residential Energy Code separate from the Commercial Energy Code
- Adds testing and verification requirements
- Promotes Innovation through Energy Ratings Index (ERI)
 - Uses a HERS-type index as an “equivalent” for residential applications
 - Mandatory requirements still apply

2018 IECC Mandatory Requirements

Energy Certificate

- Energy Certificate located on circuit breaker box includes key energy efficiency measures and is signed by the builder

Air Sealing

- All holes between floors and through exterior walls/ceilings have been sealed in **accordance with table R402.4.1.1**
- Building or dwelling unit is **tested to verify air leakage rate of ≤ 3 Air Changes per Hour (ACH)**
- Building or dwelling unit must have continuous air barrier installed

2018 IECC Mandatory Requirements

Ducts

- All ducts are sealed with approved materials (e.g. mastic or UL 181 tape) - duct tape is not acceptable
- All ducts outside conditioned space are tested to verify duct leakage with a total duct leakage or leakage to the outside test
- Supply & return ducts in attic insulated to $\geq R-6$ when ducts are outside conditioned space and $\geq R-8$ when ducts are outside the building thermal envelope

Building Cavities

- **Building framing cavities shall not be used as supply ducts or plenums**

2018 IECC Mandatory Requirements

Heating and Cooling

- Controls: Programmable thermostat installed
- Equipment sized per ACCA Manuals S & J

Lighting

- Minimum of **90% high-efficacy lamps** installed
- Recessed lighting in thermal envelope IC-rated and airtight

Mechanical Ventilation

- **Installed according to requirements in the International Mechanical Code**
- **Required for all homes ≤ 5 ACH per Section M303.4 (3 ACH is a 2018 IECC mandatory requirement)**

2018 IECC Mandatory Requirements

Other requirements

- Wood-burning fireplaces have tight flue dampers or doors, and outdoor combustion air
- Mechanical system piping insulated to min R-3 for fluids $>105^{\circ}$ F or $<55^{\circ}$ F
- Circulating hot water systems shall be insulated to at least R-2. Systems shall include an automatic, or readily accessible, off-switch.

Energy Code Compliance Pathways

Prescriptive Method Requirements

- All mandatory and prescriptive requirements must be met

Total UA Method Requirements

- All mandatory and prescriptive requirements (other than Table R402.1.2) must be met
- Include documentation to demonstrate compliance with the UA Trade-off method. Compliance software submittal must include completed compliance form, inspection checklist and certificate demonstrating compliance with 2018 IECC levels



Energy Code Compliance Pathways

Simulated Performance Requirements (Section R405)

- All mandatory requirements must be met
- Submit an energy cost analysis report which demonstrates that the proposed design (as built) home is more efficient than the standard reference design home

Energy Rating Index Requirements (Section R406)

- All Mandatory requirements met. Meet or exceed 2009 IECC prescriptive envelope requirements
- ERI score of 61 or lower. Submit report demonstrating compliance

Structure of Commercial 2018 IECC

- Ch. 1 Scope and Application / Administrative and Enforcement
- Ch. 2 Definitions
- Ch. 3 General Requirements
- Ch. 4 Commercial Energy Efficiency
- Ch. 5 Existing Buildings
- Ch. 6 Referenced Standards
- Index

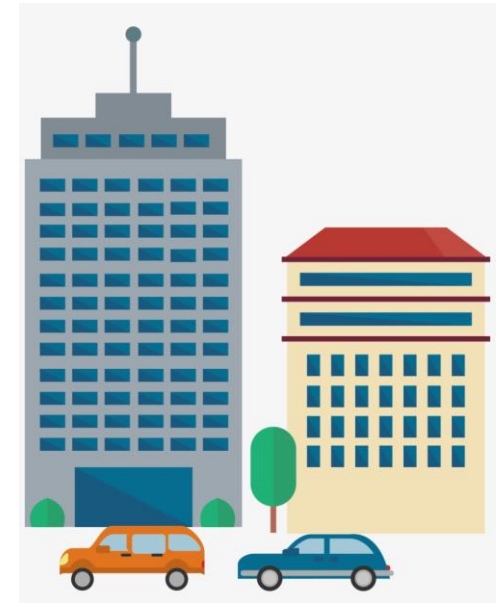
Commercial Buildings in the IECC

Under the Purview of the Commercial Code

- ✓ Buildings with commercial use
- ✓ Multifamily residential buildings four stories or greater in height

Not Under the Purview of the Commercial Code

- × One- and two-family residential
- × R-2, R-3, R-4 three stories or less in height



What About Mixed Use? – C101.4.1

- Treat the residential building portion under the applicable residential code
- Treat the commercial building portion under the commercial code
- Code Official has final authority



Image: agarch.com

Commercial Compliance Options

ASHRAE 90.1-2016

OR

2018 IECC – Prescriptive

- ✓ C402 – Envelope
- ✓ C403 – Mechanical
- ✓ C404 – SWH
- ✓ C405 – Lighting

AND Pick at Least One C406:

- C406.2 – Eff. HVAC Performance
- C406.3 – Reduced Lighting Power
- C406.4 – Enhanced Lighting Controls
- C406.5 – On-site Supply of Renewable Energy
- C406.6 – Dedicated Outdoor Air System
- C406.7 – High Eff. Service Water Heating
- C406.8 – Enhanced Envelope Performance
- C406.9 – Reduced Air Infiltration

OR

2018 IECC – Performance

- C407 – Total Building Performance
- C402.5 – Air Leakage
- C403 – Mandatory Mechanical Provisions
- C404 – SWH
- C405 – Lighting
- Building energy cost to be < 85% of standard reference design building



Building Envelope Compliance Options

3 Methods for compliance of building components:

- C402.1.3 – Insulation component R-value based method
- C402.1.4 – Assembly U-factor, C-factor or F-factor based method
- C402.1.5 – Component Performance Alternative

Building Envelope

- All of the elements of the envelope and the assembly methods (and details) determine how well the building envelope performs.
- The building envelope must be an unbroken boundary surrounding the structure.
- All elements must be in close alignment with each other.



Photo courtesy of U.S. Gypsum



Performance Testing

A Great Quality Control Tool

Air Leakage & Continuous Air Barrier Testing

Section C402.5

- Continuous Air Barrier Required
- Two Compliance Options
 - ASTM E 779 (blower door test)
 - Compliant assemblies
 - C402.5.1 through C402.5.8



Image: energyconservatory.com

Air Leakage Report

- Blower door test documents a home's air leakage performance
- Required by code
- Third party verification (some areas; performed by Inspectors)
- Provides solid data for final equipment adjustment and energy use/cost forecast
- Great liability protection for all involved

AIR LEAKAGE REPORT

Date: May 02, 2012 Rating No.: 8016891 - 097

Building Name: 802EastMcCartyStreet Rating Org.: ASERusa
 Owner's Name: River City Habitat for Humanity Phone No.: 314-894-2300
 Property: 802 East McCarty Street Rater's Name: Gary Fries
 Address: Jefferson City, MO 65101 Rater's No.: 8016891
 Builder's Name: River City Habitat for Humanity Rating Type: Confirmed
 Weather Site: Columbia, MO Rating Date: 12/01/11
 File Name: 8016891 - 097 - eSTAR 2.0, TC, NR - 802 East M

Whole House Infiltration	Blower door test	
	Heating	Cooling
NaturalACH:	0.23	0.16
ACH @ 50 Pascals:	3.78	3.78
CFM @ 25 Pascals:	427	427
CFM @ 50 Pascals:	670	670
Eff. Leakage Area: [sq.in]	36.8	36.8
Specific Leakage Area:	0.00018	0.00018
ELA/100 sf shell: [sq.in]	0.96	0.96

Duct Leakage	Leakage to Outside Units	Ductwork
CFM @ 25 Pascals:		25
CFM25 / CFMfan:		0.0214
CFM25/CFA:		0.0181
CFM per Std 152:		N/A
CFM per Std 152 / CFA:		N/A
CFM @ 50 Pascals:		39
Eff. Leakage Area: [sq.in]		2.15
Thermal Efficiency:		N/A
Total Duct Leakage Units		CFM25/CFA
Total Duct Leakage:		0.0181

Ventilation	Air Cyclor
Mechanical:	
Sensible Recovery Eff. (%):	0.0
Total Recovery Eff. (%):	0.0
Rate (cfm):	50
Hours/Day:	24.0
Fan Watts:	150.0
Cooling Ventilation:	Natural Ventilation

ASHRAE 62.2 - 2010 Ventilation Requirements

For this home to comply with ASHRAE Standard 62.2 - 2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, a minimum of 44 cfm of mechanical ventilation must be provided continuously, 24 hours per day. Alternatively, an intermittently operating mechanical ventilation system may be used if the ventilation rate is adjusted accordingly. For example, a 88 cfm mechanical ventilation system would need to operate 12 hours per day, as long as the system operates to provide required average ventilation once each hour.

REM/Rate - Residential Energy Analysis and Rating Software v12.98

This information does not constitute any warranty of energy cost or savings.
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Air Leakage Report

Date:	May 02, 2012	Rating No.:	81158891-901
Building Name:	123 Main Street	Rating Org.:	Raters USA
Owners Name:	Jane Smith	Phone:	555-555-5555
Property Address:	123 Main Street Omaha, NE 68007	Rater's Name:	John Williams
Builder's Name:	ABC Construction	Rater's No:	1234567
Weather Site:	Omaha, NE	Rating Type:	Confirmed
File Name:	101682391-097 eSTAR	Rating Date:	12/01/20

AIR LEAKAGE REPORT			
Date:	May 02, 2012	Rating No.:	8016891 - 097
Building Name:	802EastMcCartyStreet	Rating Org.:	ASERusa
Owner's Name:	River City Habitat for Humanit	Phone No.:	314-894-2300
Property:	802 East McCarty Street	Rater's Name:	Gary Fries
Address:	Jefferson City, MO 65101	Rater's No.:	8016891
Builder's Name:	River City Habitat for Humanit	Rating Type:	Confirmed
Weather Site:	Columbia, MO	Rating Date:	12/01/11
File Name:	8016891 - 097 - eSTAR 2.0, TC, NR - 802 East M		

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Builder's Name:	River City Habitat for Humanit	Rating Type:	Confirmed
Weather Site:	Columbia, MO	Rating Date:	12/01/11
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Systems Commissioning and Completion Requirements

Section C408

- Commissioning is critical to ensure that buildings are **working as designed**
- Preliminary and final reports required
- Mechanical and lighting commissioning detailed in section C408

Benefits of Commissioning



Ventilation and I.A.Q.



Building Envelope +
Air Sealing Package +
HVAC Design, Equipment & Installation +
ERV/HRV +
Water Heating Design

= Occupant Comfort



Moisture Management

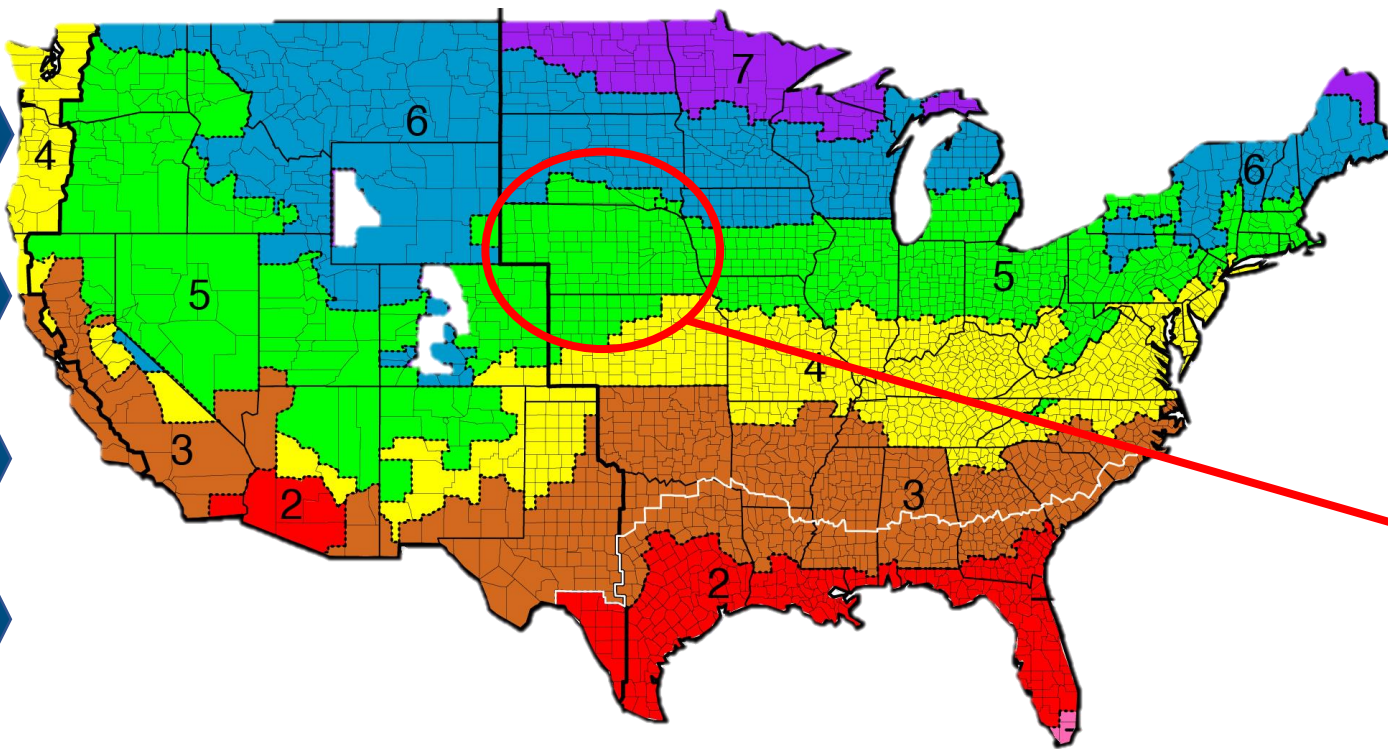
It Connects EVERYTHING!



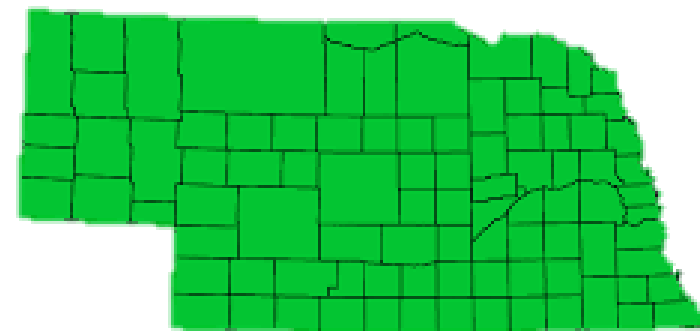
The Major “Damage Functions”

- Liquid water (bulk and capillary)
- Air-borne water
- Vapor
- Radiation (UV degradation)
- Pests
- People

Climate Zones



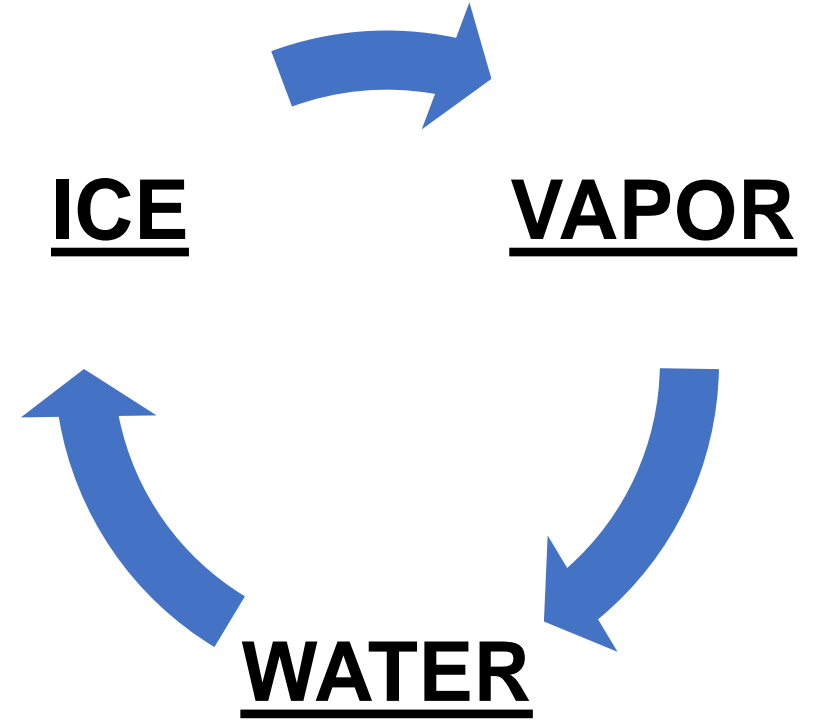
- Nebraska has only one climate zone – 5A
- Cold & Moist climate





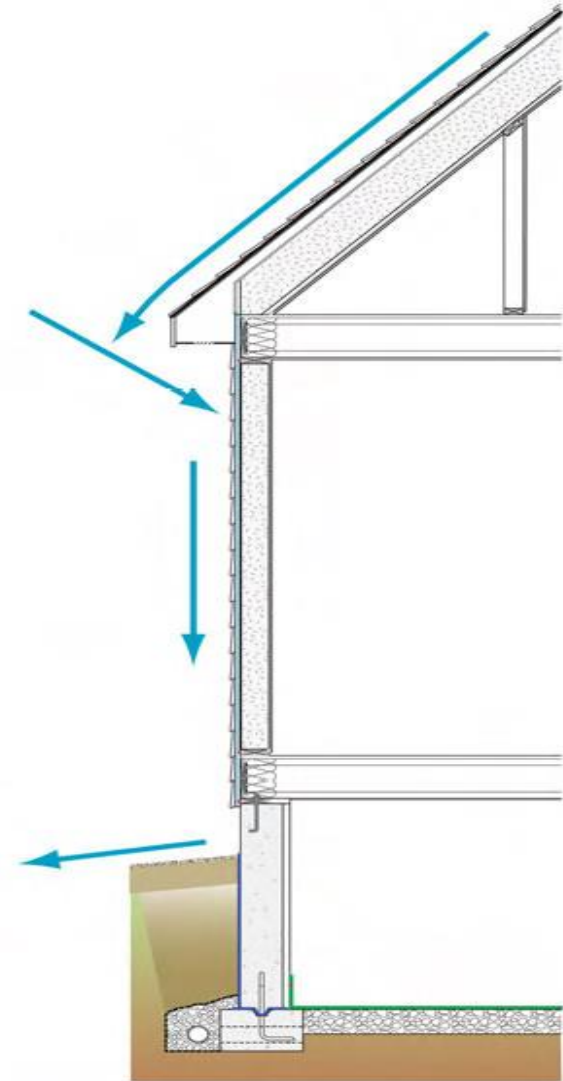
Prioritizing Moisture Movement

- #1 – Bulk Water
- #2 – Capillary Water
- #3 – Air-Transported Moisture
- #4 – Diffusive Moisture Movement



Bulk Water Management – Priority #1

The key is proper drainage!



Always Allow For Drying

Exterior Conditions

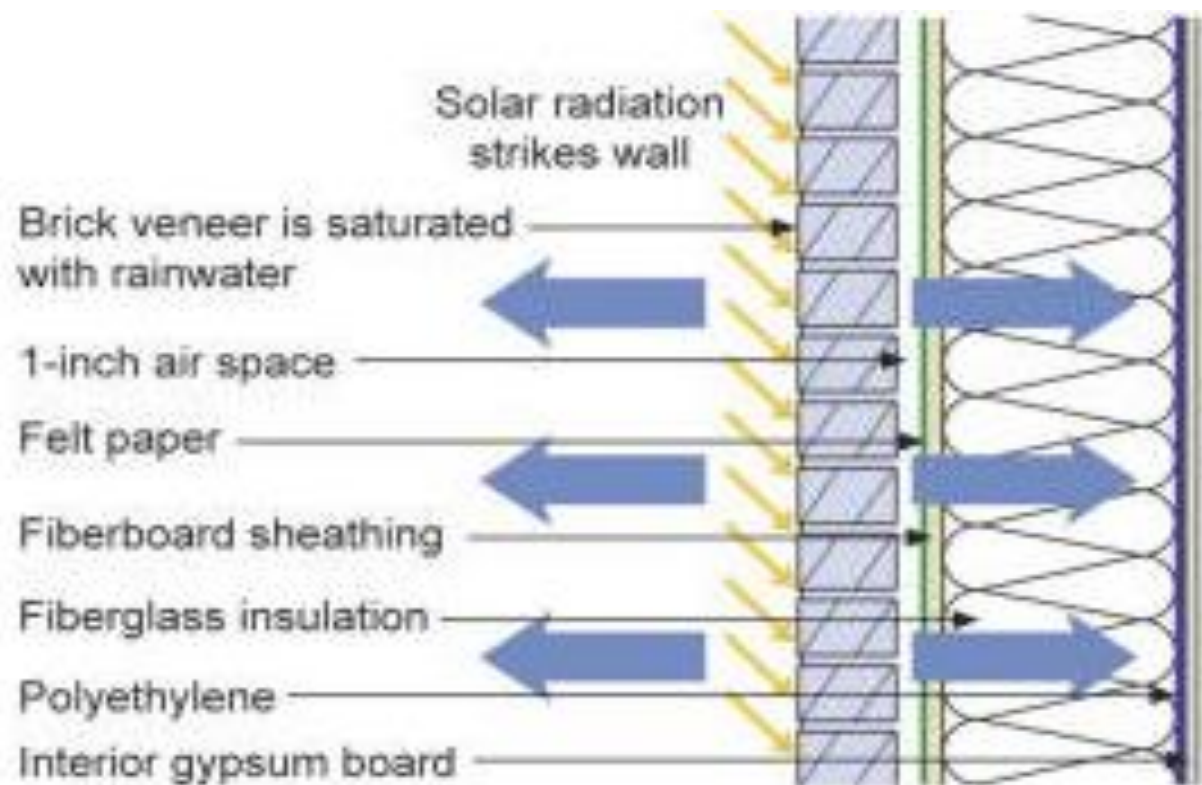
Temperature: 80° F
Relative Humidity: 75%
Vapor Pressure: 2.49 kPa

Conditions Within Cavity

Temperature: 120° F
Relative Humidity: 100%
Vapor Pressure: 11.74 kPa

Interior Conditions

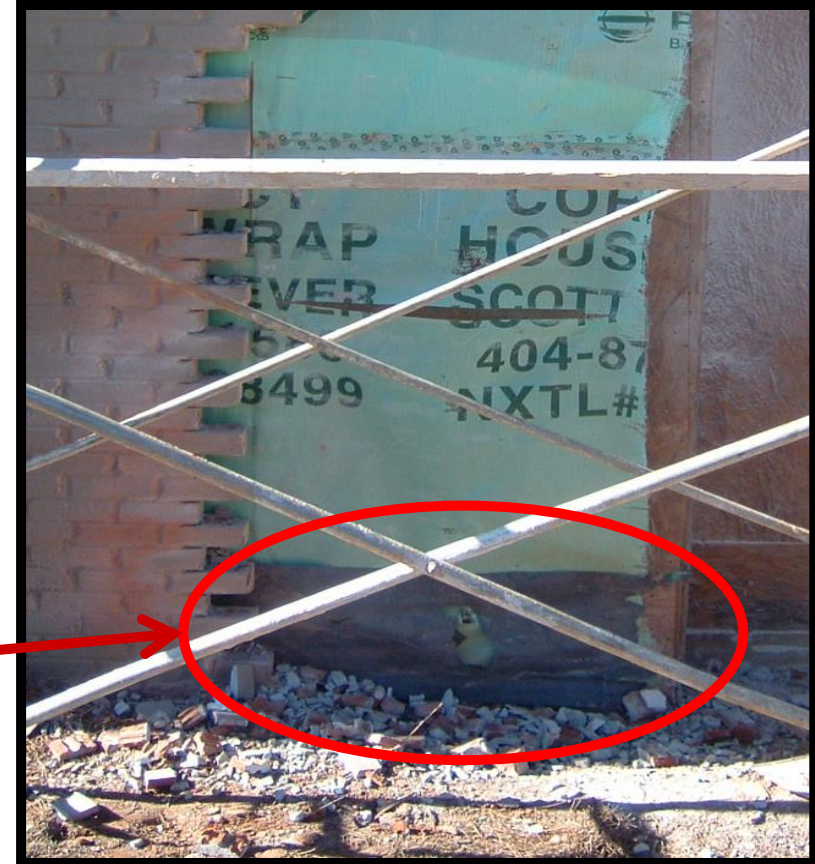
Temperature: 75° F
Relative Humidity: 60%
Vapor Pressure: 1.82 kPa



Vapor is driven both inward and outward by a high vapor pressure differential between the brick and interior and the brick and exterior

Properly Lap Flashing

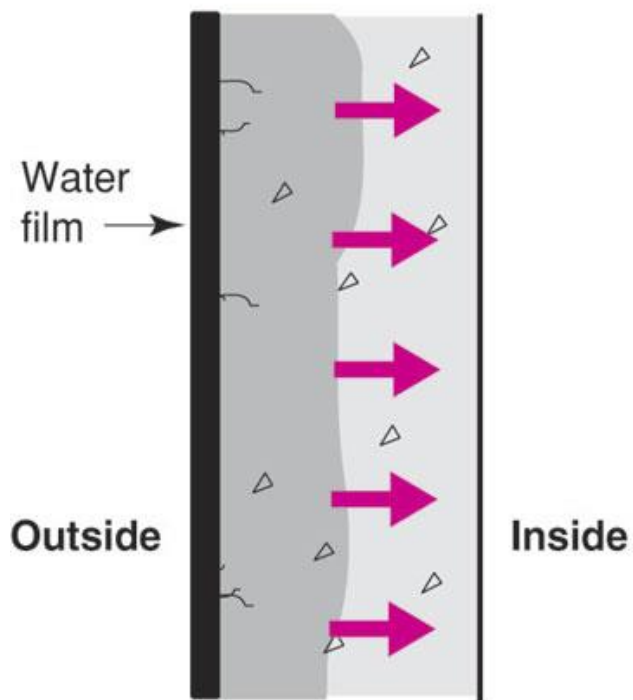
- The mason's flashing (black) was installed after and in front of the house wrap (green). This is reverse flashing that will trap any drain water that gets past the brick veneer.



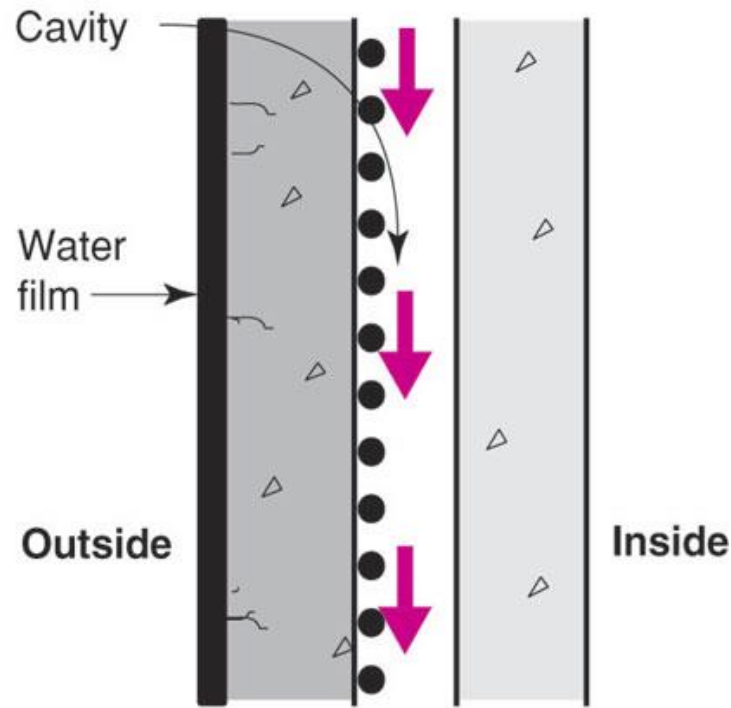
Direct Water Away From Corners



Capillary Moisture Flows - Priority #2



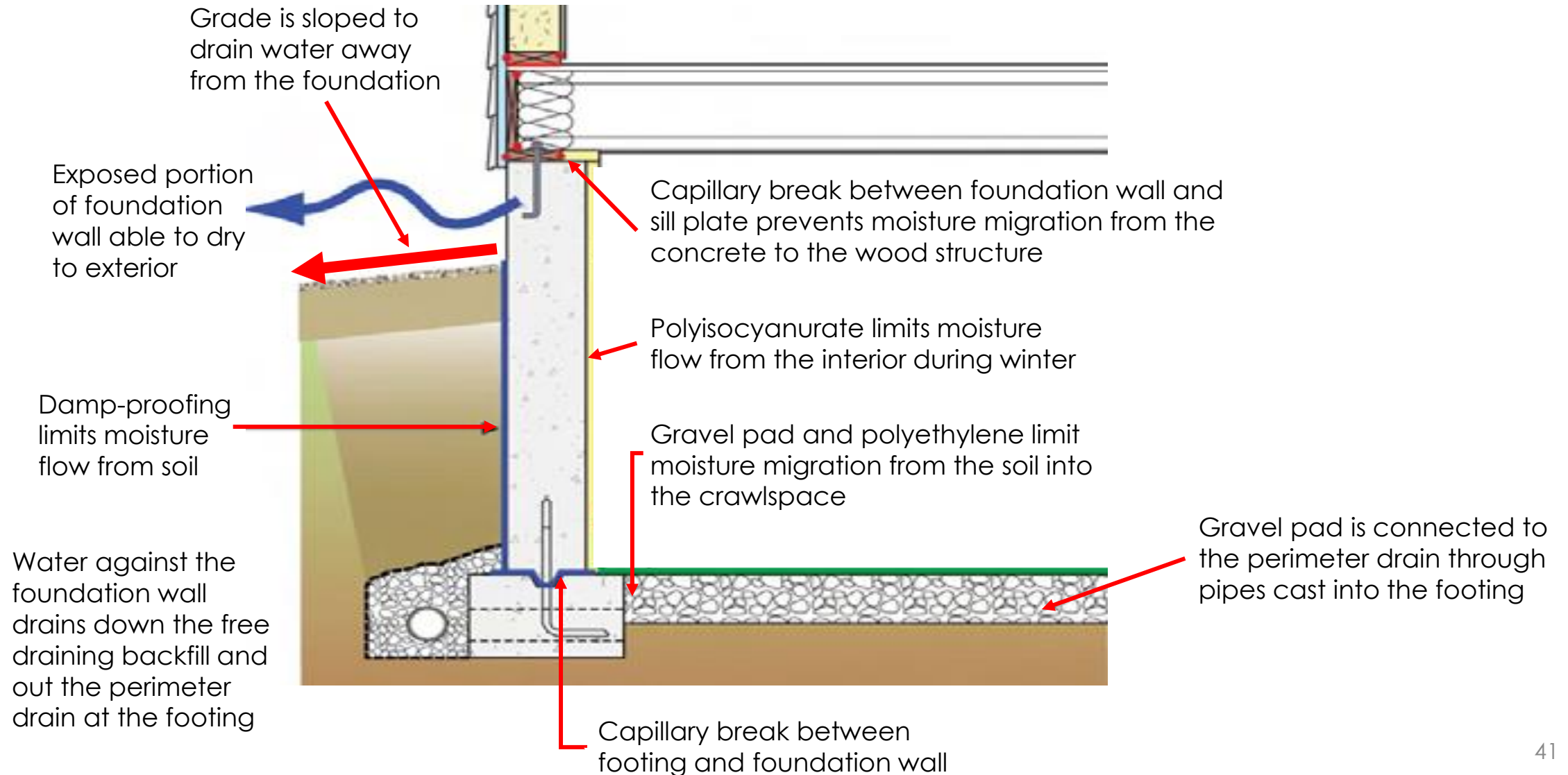
Capillary suction draws water into porous material and tiny cracks



Cavity acts as capillary break and receptor for capillary water interrupting flow

Image courtesy of Building Science Corp.

Foundation Moisture Management



Sill Plates Need Capillary Breaks



Air Transport of Moisture – Priority #3

- Air carries a **lot** of water
- Air leakage
 - Moisture flow
 - 4X8 Drywall
 - 70 F
 - 40% RH
 - 1 square inch hole
- Flow quantity
 - 30 Quarts of water!!

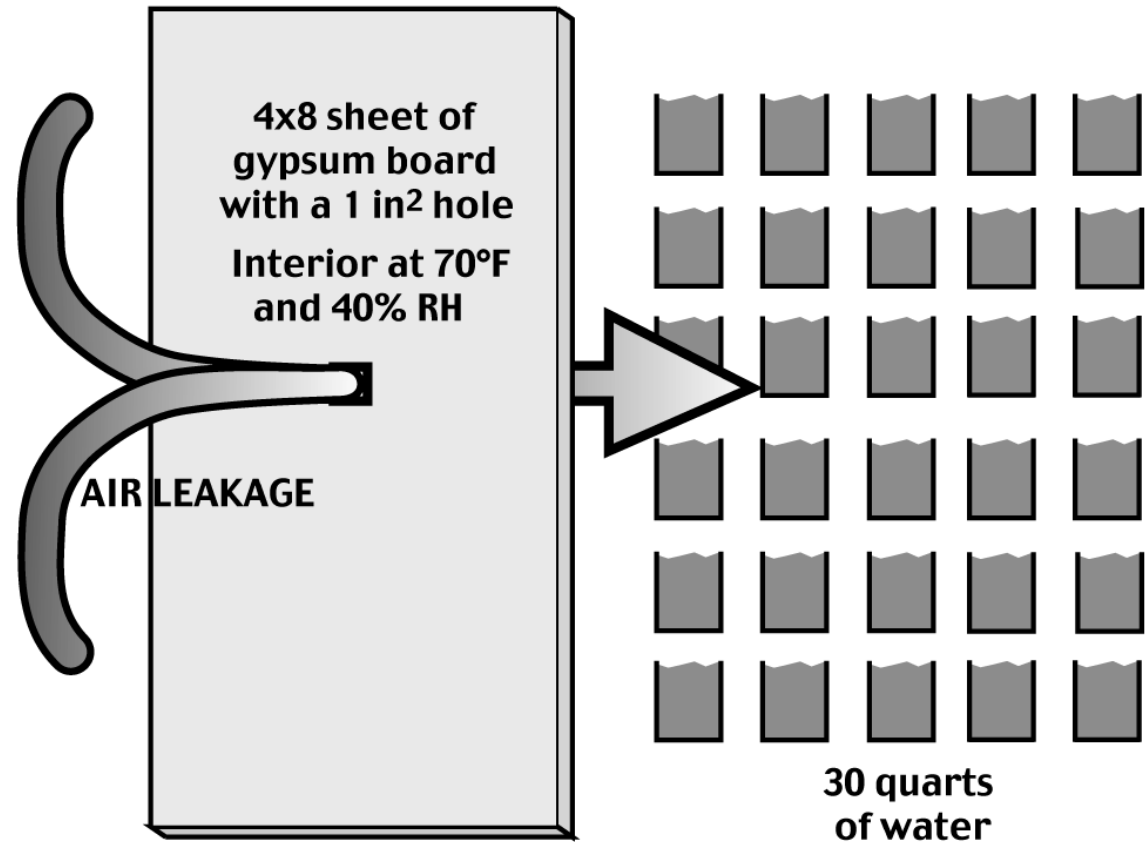


Image courtesy of Building Science Corp.

Diffusion – Priority #4

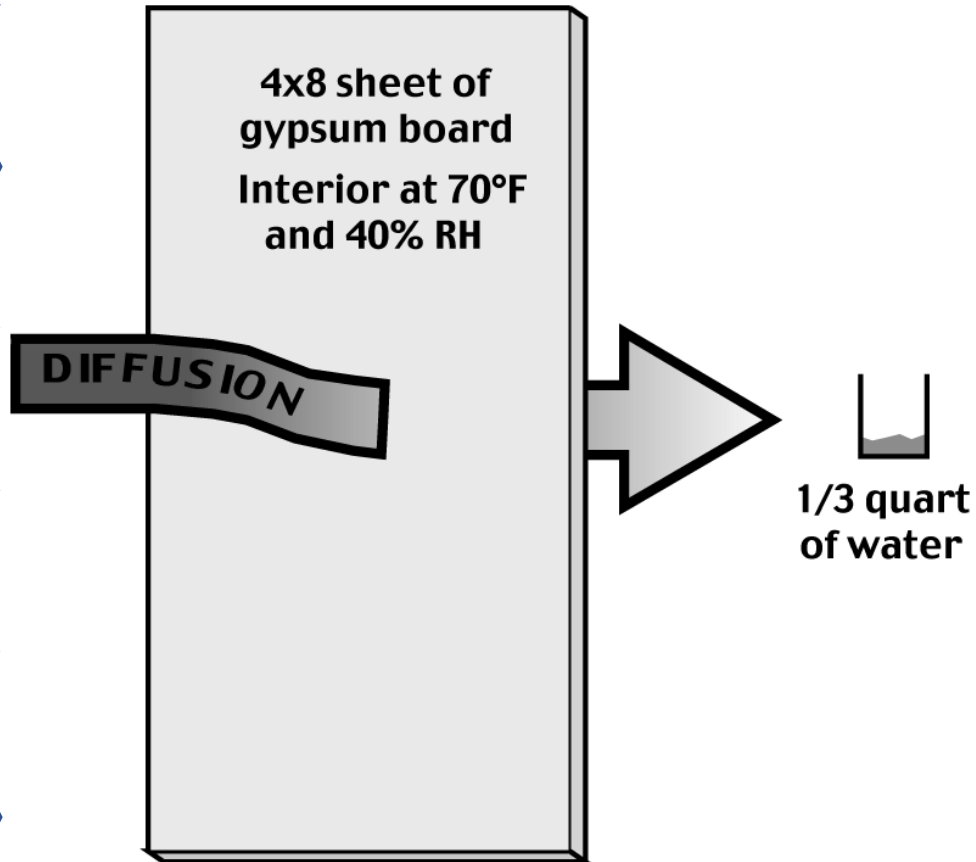


Image courtesy of Building Science Corp.

- Migration of moisture by means of vapor pressure differential
- Occurs in either direction based on climate conditions and exterior/interior levels of humidity
- Different building materials have different permeability



Air Movement

Air Movement Seeks Balance

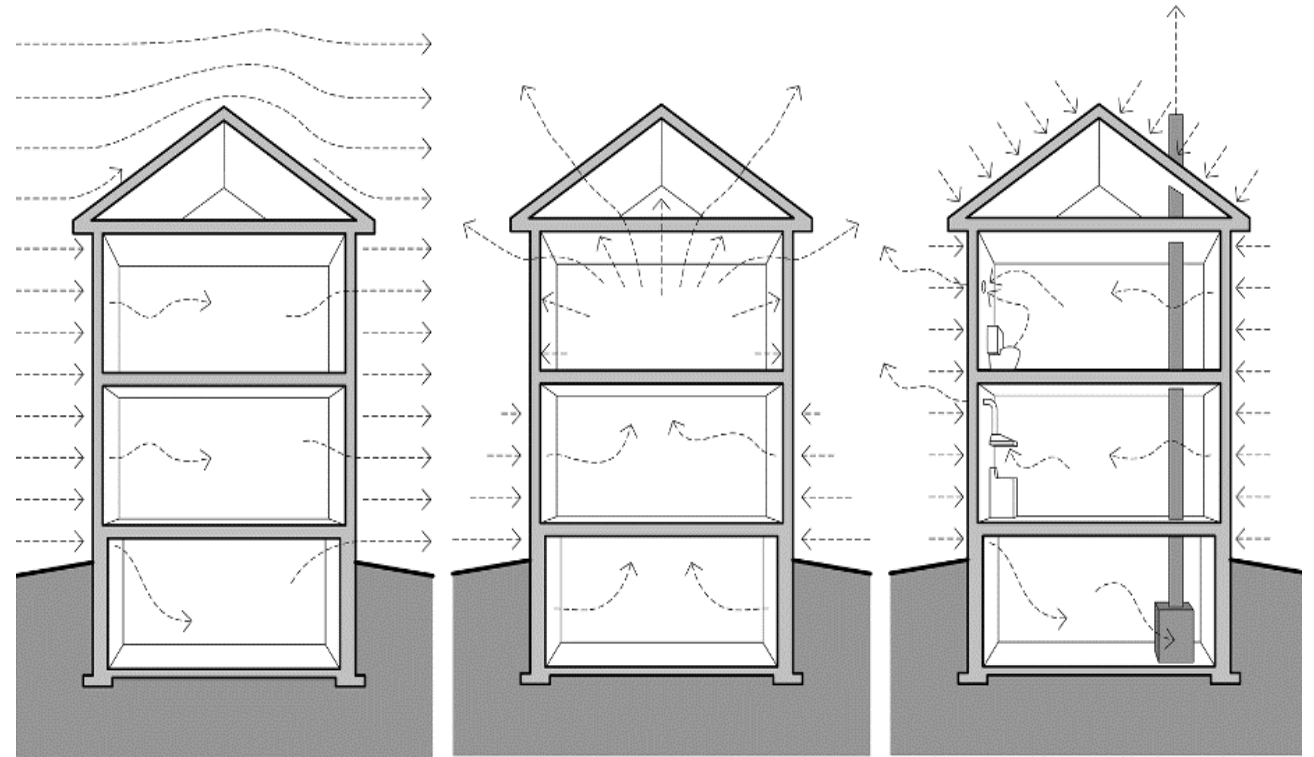


How Does Air Get Around?

Air In = Air Out

For air movement you need:

- A hole
- A driving force
- Another hole



Wind Effect

Stack Effect

Combustion and Ventilation

Internally Generated Air Pressure

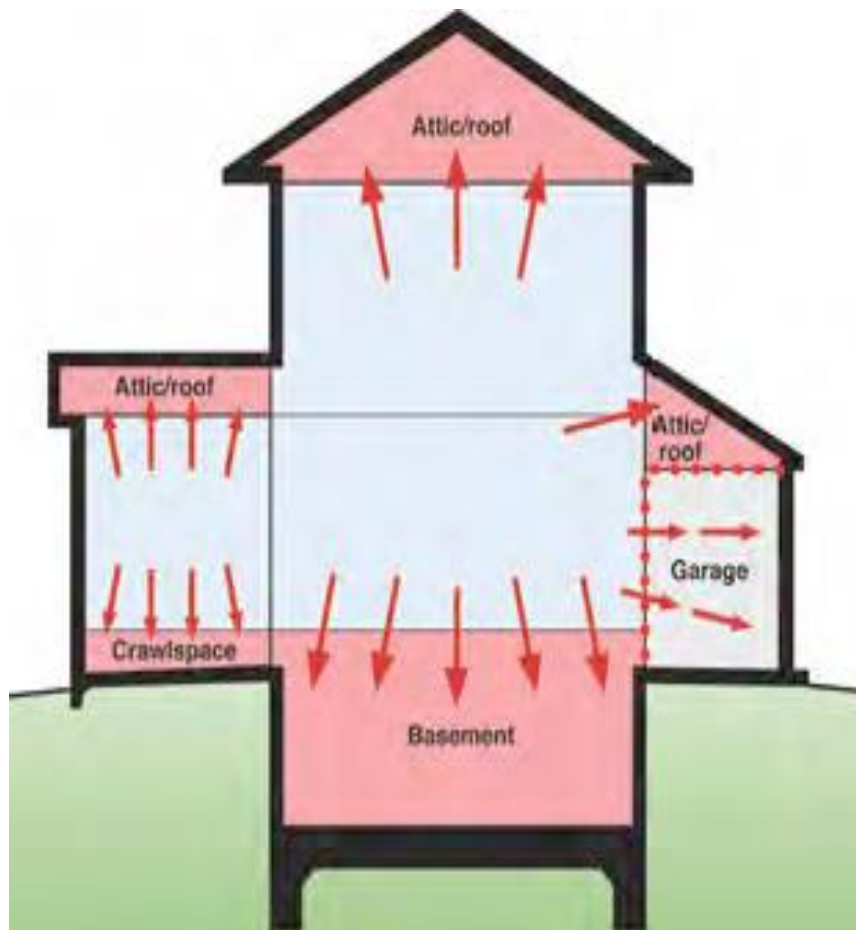


Image by Belcher Homes

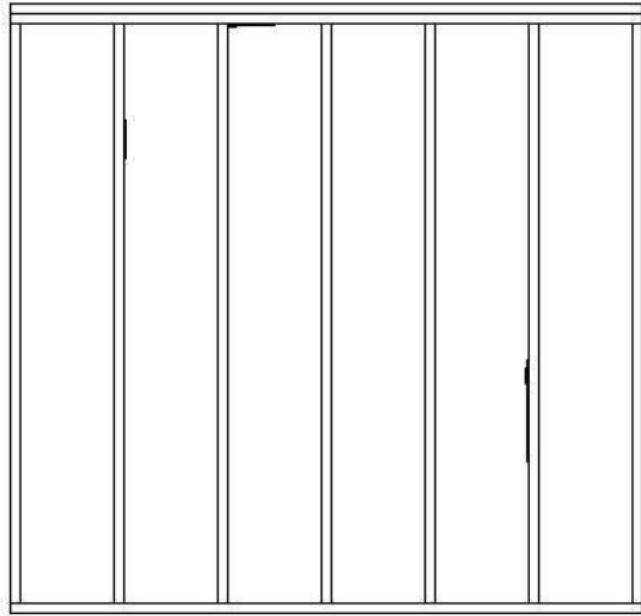
Expansion of Conditioned Space

- Conditioned space boundaries moving towards exterior surfaces of building
- Garage isolated from house by air barrier/pressure boundary
- Garage ventilated and conditioned independently of rest of conditioned spaces

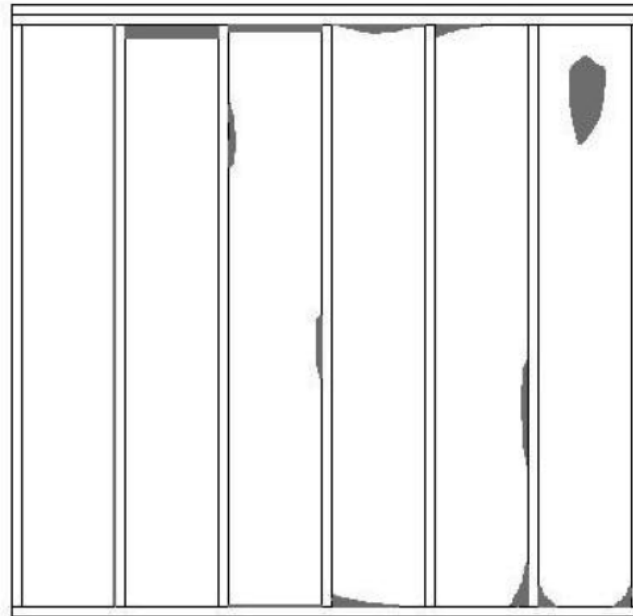
Batt Insulation Grading

Code Compliant

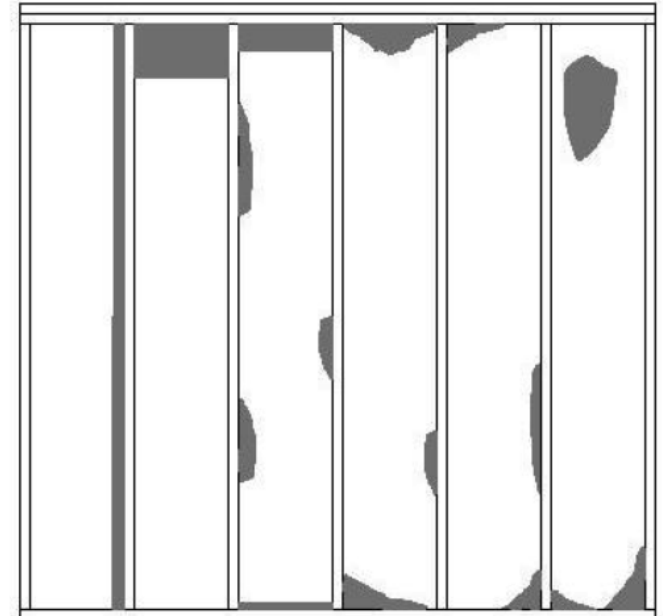
Not Acceptable



Grade I: Almost no gaps



Grade II: Up to 2%



Grade III: 2% - 5%

RESNET protocol for the effect of missing insulation on installation grade

Diagrams from the HERS Standards



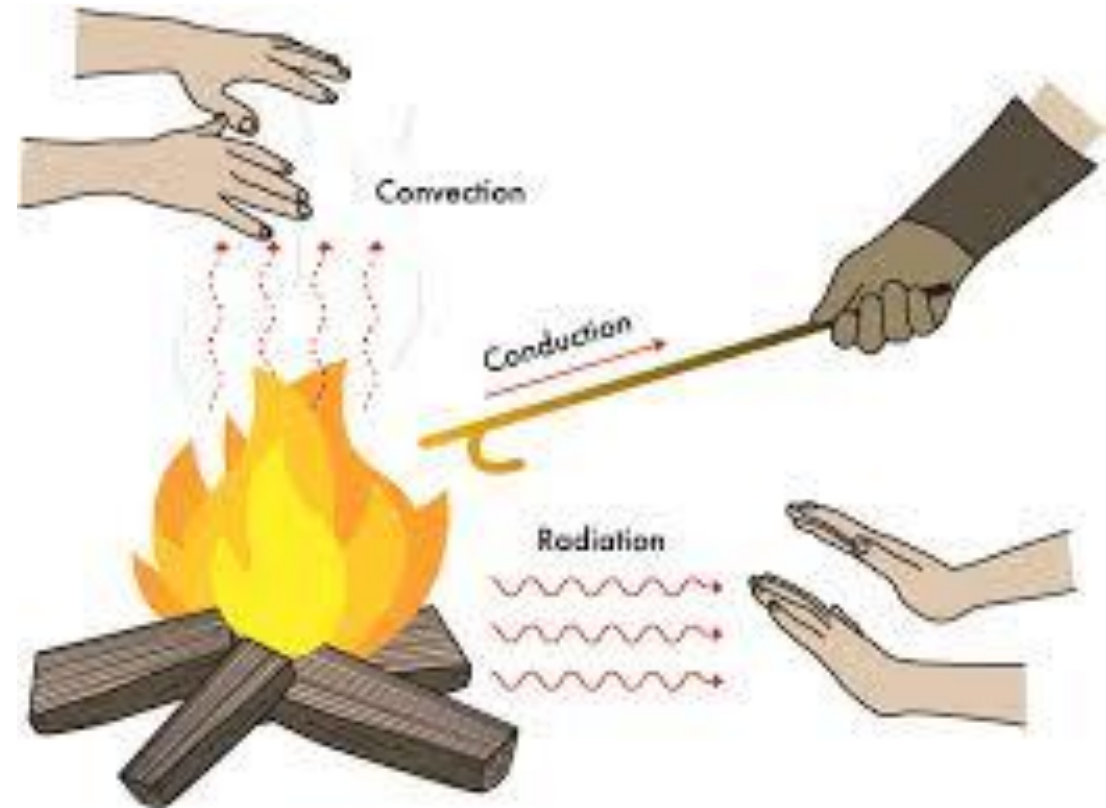
Heat Transfer

A Triple Threat



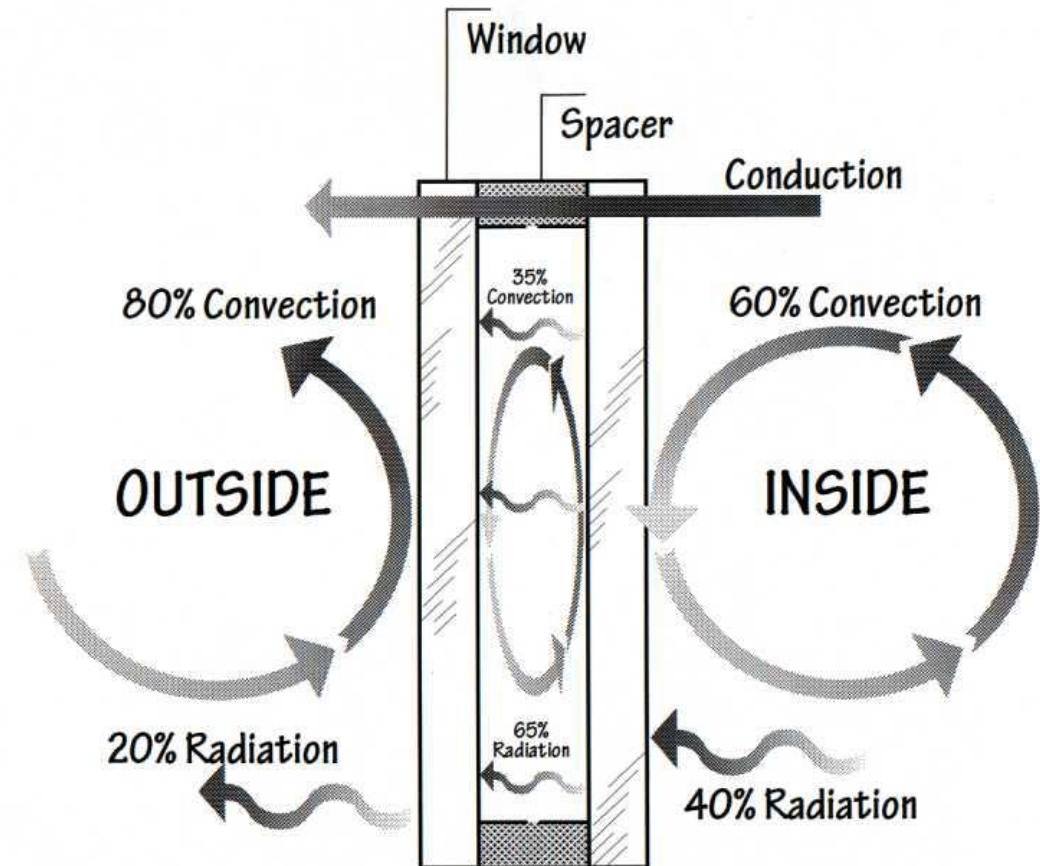
Heat Transfers in 3 Ways

- **Convection** - Through fluids (liquid or gas)
- **Conduction** - Through solids
- **Radiation** - Mostly windows



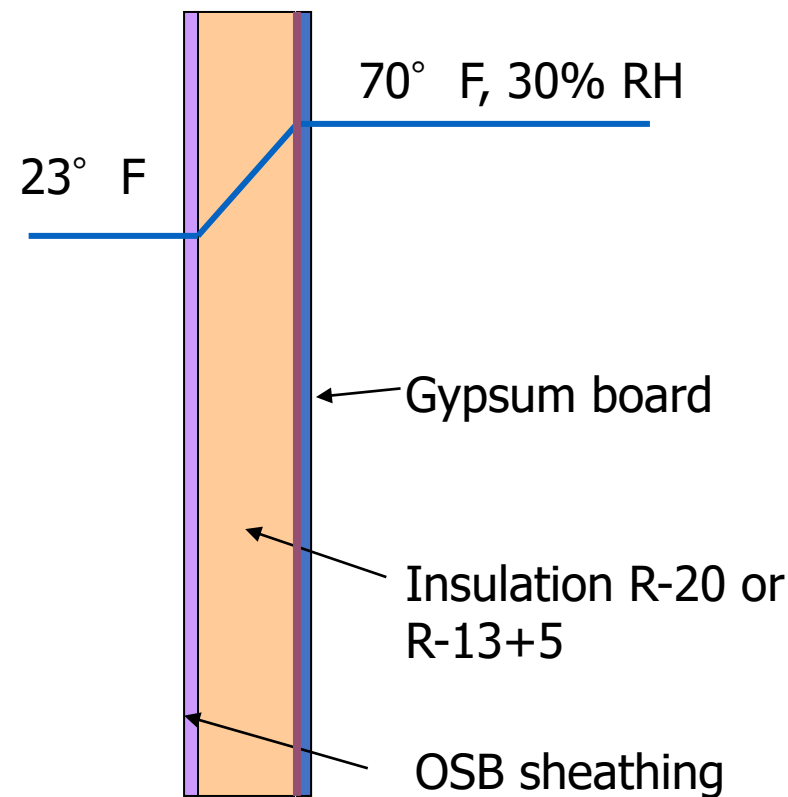
Practical Application - Windows

- Heat always moves from hot to cold
- Always a mix of transfers
- Different rates of transfer can be important



Condensing Surface Temperatures

- Dewpoint of interior air = 37°F
- Where will condensation occur?
Inside surface of exterior sheathing
- One Solution?
Interior vapor retarder, but what type and at what “cost?”





Major Building Envelope Protection Systems

- Water Barrier
- Air Barrier
- Thermal Barrier
- Vapor Profile (not just the designated vapor retarder)
- Maintenance documents

“You don’t get what you expect, you get what you inspect!”





HVAC System

Don't Forget the "V"



HVAC Design and Loads

Oversized systems:

- Less comfort
- Less efficient
- Poorly handles moisture
- Premature equipment failure

Right-sized systems:

- Better operating efficiencies
- Greater comfort
- Healthier indoor environments
- Better moisture control

HVAC Design and Loads

- Properly designed HVAC systems rely on scientific criteria and a systematic method to match the loads required for health and comfort:
 - *ACCA Manual J – Residential Load Calculation*
 - *ACCA Manual S – Residential Equipment Selection*
 - *ACCA Manual D – Residential Duct Systems*
- Reports should be submitted with permit application





HVAC Design and Loads

Today's homes risk health problems for occupants because:

- They are not properly ventilated:
 - < 3 ACH
- More chemicals and products are used in and around a house:
 - Concentration levels are often 2 to 100 times higher than outside.



Balanced Ventilation

- Blows air into and out of the house
- Is cost effective by reclaiming energy from exhaust and supply airflows (60%-80%!)
- Balances exhaust and supply flows (minimizes pressure differential)
- Maintains the Minimum Ventilation Guideline automatically with proper set-up

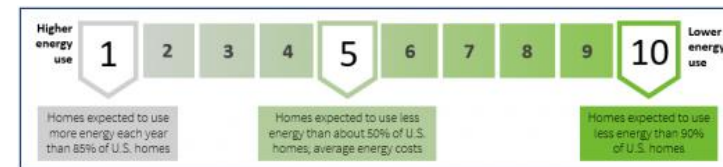
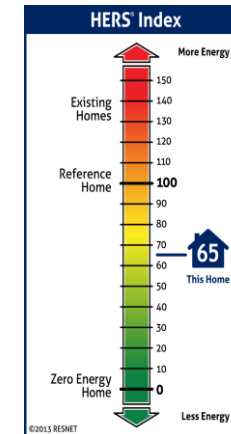


Appraisals and Resale Value



Appraisers

- Unlike granite countertops, energy efficiency investments are not always visible at a glance
- Utilize certifications, labels, ratings, and scores
- Make sure appraisers are accurately valuing sustainable properties
 - *Residential Green and Energy Efficient Addendum* - Assists appraisers in analyzing residential “Green” features and properties.



Residential Green and Energy Efficient Addendum!

- Resources for realtors and appraisers on properly valuing energy efficiency/green features
 - Educational materials
 - List of designated appraisers
 - Trainings
- For more information: http://www.appraisalinstitute.org/education/green_energy_addendum.aspx

Client File #:		Appraisal File #:	
Residential Green and Energy Efficient Addendum			
Client:			
Subject Property:			
City:	State:	Zip:	
Additional resources to aid in the valuation of green properties and the completion of this form can be found at http://www.appraisalinstitute.org/education/green_energy_addendum.aspx			
<p>The appraiser hereby certifies that the information provided within this addendum:</p> <ul style="list-style-type: none"> has been considered in the appraiser's development of the appraisal of the subject property only for the client and intended user(s) identified in the appraisal report and only for the intended use stated in the report. is not provided by the appraiser for any other purpose and should not be relied upon by parties other than those identified by the appraiser as the client or intended user(s) in the report. is the result of the appraiser's routine inspection of and inquiries about the subject property's green and energy efficient features. Extraordinary assumption: Data provided herein is assumed to be accurate and if found to be in error could alter the appraiser's opinions or conclusions. is not made as a representation or as a warranty as to the efficiency, quality, function, operability, reliability or cost savings of the reported items or of the subject property in general, and this addendum should not be relied upon for such assessments. <p>Green Building: The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's lifecycle from siting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classic building design concerns of economy, utility, durability, and comfort (US EPA). High Performance building and green building are often used interchangeably.</p> <p>Six Elements of Green Building: A green building has attributes that fall into the six elements of green building known as (1) site, (2) water, (3) energy, (4) materials, (5) indoor environmental quality, and (6) maintenance and operation. The energy and water elements are the most measurable elements of green or high performance housing. Appraisers need savings amounts to develop an income approach to support energy efficient contributory value.</p>			
THIRD-PARTY VERIFICATIONS (See types defined in glossary)			
The following verified items are considered within the appraisal analysis of the subject property:			
Green Certification	Environmental Protection Agency (EPA):	<input type="checkbox"/> Indoor AIRPLUS	<input type="checkbox"/> WaterSense
	Energy Department (DOE):	<input type="checkbox"/> Zero Energy Ready Home (ZERH)	
Certifications attest that the home meets or exceeds minimum thresholds:	Home Innovation Research Labs (HIRL) Green Building Challenge (GBC):	<input type="checkbox"/> Bronze	<input type="checkbox"/> Silver
	Home Innovation Research Labs (HIRL) Green Building Challenge (GBC):	<input type="checkbox"/> Gold	<input type="checkbox"/> Emerald
	Residential Standard:	<input type="checkbox"/> Net Zero Energy	<input type="checkbox"/> EnergyStar
	Passive House Institute US:	<input type="checkbox"/> Passive House	
	USGBC LEED:	<input type="checkbox"/> Certified	<input type="checkbox"/> Silver
	Other:	<input type="checkbox"/> Gold	<input type="checkbox"/> Platinum
Date Verified: / /	Green Certification Version: _____	ABOVE VALID ONLY IF CHECKED:	
Organization URL: _____	<input type="checkbox"/> www.epa.gov	<input type="checkbox"/> Verification reviewed on site	
	<input type="checkbox"/> www.homeenergyscore.gov	<input type="checkbox"/> Verification attached to this report	
	Other: _____		
Energy Label	RESNET's HERG Rating (0 to 150):	Estimated energy savings for this home: \$ _____ /year	_____ c/kWh rate dated / /
Labels disclose the state the home's energy assets.	<input type="checkbox"/> Sampling Rating	Energy Savings includes electricity, heating & Cooling.	
	<input type="checkbox"/> Projected Rating	Score below 100 indicates energy costs are expected to be lower than average local code home per square foot. HERG index Report estimates energy cost based on number of bedrooms plus one. Only a "confirmed rating" is a diagnostic test.	
	<input type="checkbox"/> Confirmed Rating	DOE's Home Energy Score (1 to 10):	Estimated energy savings for this home: \$ _____ /year
	<input type="checkbox"/> Official Score	Energy Savings includes electricity, heating & Cooling.	_____ c/kWh rate dated / /
	<input type="checkbox"/> Unofficial Score	Score above five indicates energy costs are expected to be lower than average local home. Home Energy Score estimates energy cost based on state average energy rates and the home's energy features.	
	Other Energy Score: _____	Estimated energy savings: \$ _____ /year	_____ c/kWh rate dated / /
	Range (_____ to _____)	Describe energy label system: _____	
Date Verified: / /	Score or Rating Version: _____	ABOVE VALID ONLY IF CHECKED:	
Organization URL: _____	<input type="checkbox"/> www.resnet.us	<input type="checkbox"/> Verification reviewed on site	
	<input type="checkbox"/> www.homeenergyscore.gov	<input type="checkbox"/> Verification attached to this report	
	Other: _____		
Verified Energy Improvements	Explain energy-related improvements:		
	Cost of improvements: \$ _____		
Only include improvements with verified documentation:	Date Verified: / /	Certificate of Efficiency Improvements Version: _____	ABOVE VALID ONLY IF CHECKED:
	Organization URL: _____	Other: _____	<input type="checkbox"/> Verification reviewed on site
	<input type="checkbox"/> www.iccc.org	<input type="checkbox"/> www.epa.gov	<input type="checkbox"/> Verification attached to this report
Completed by: _____	Title: _____	Date: _____	

*NOTICE: The Appraisal Institute publishes this form for use by appraisers where the appraiser deems use of the form appropriate. Depending on the assignment, the appraiser may need to provide additional data, analysis and work product not called for in this form. The Appraisal Institute makes no representations, warranties or guarantees as to, and assumes no responsibility for, the data, analysis or work product provided by the individual appraiser(s) in the specific contents of the Appraisal Institute's AI-R20.04 Residential Green and Energy Efficient Addendum Appraisal Institute 2012. All Rights Reserved. November 2010



Lender Specification

“This Home/Building is being built/renovated/updated to nationally recognized standards above prevailing code. It is designed and constructed with unique features and materials and with high efficient equipment and in accordance with high efficiency standards. The Lender shall choose an Appraiser educated and knowledgeable in this type of valuation of these specialized Homes, preferably an appraiser who holds a professional appraisal designation that requires advanced education on such issues as the valuation of sustainable buildings (e.g. MAI or SRA designations from the Appraisal Institute). The appraiser shall provide verification of green valuation education of 14 hours or more from a qualified educational provider and knowledge to be permitted to conduct the appraisal for this project.”

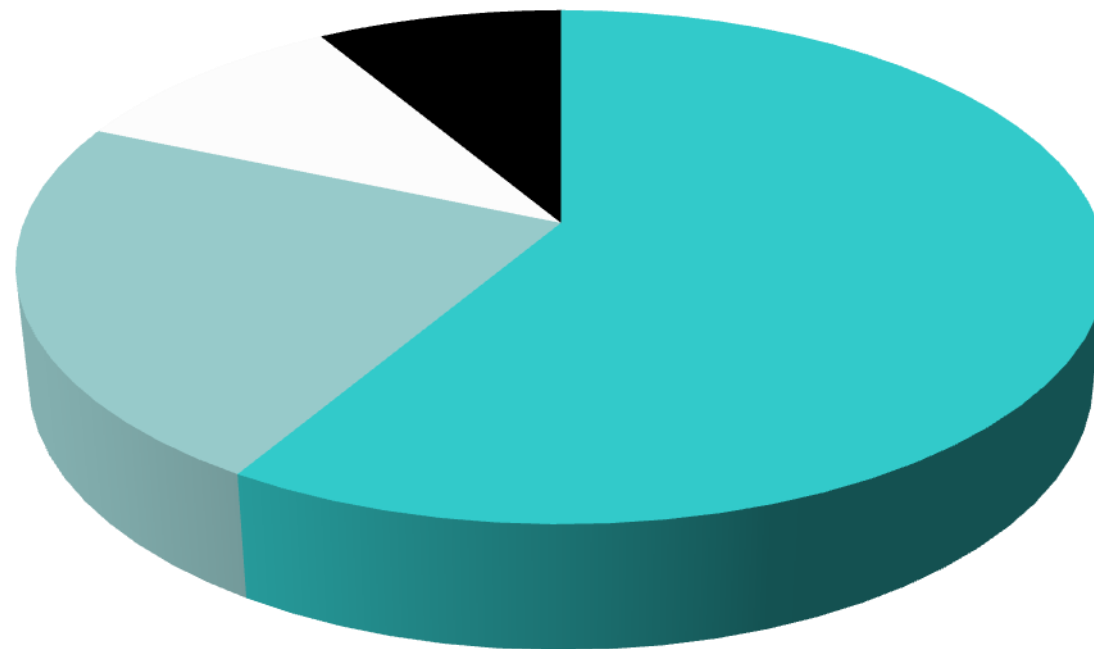


Marketing High Performance



Financial Equity!

Cost



- Int/Tax, etc.
- Energy
- O&M
- Other

Monthly Payment

Key Takeaways

- 2018 IECC has new requirements for:
 - Air sealing
 - Duct sealing
 - U-Factor
 - R-Values
 - Performance Testing
- Controlling moisture is *critical*
 - Proper air sealing is key
 - Right-sizing HVAC is required
 - Mechanical ventilation must be installed and takes on new importance



Thank you!

Matt Belcher, Verdatek Solutions

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314-749-4189 Cell



Questions

- Contact Matt Belcher at: matt@verda-solutions.com
- Corie Anderson at: canderson@mwalliance.org
- Visit: <https://www.mwalliance.org/nebraska-energy-codes-training-program>



Tomorrow in Lincoln

- **Nebraska Energy Codes Collaborative Meeting**

- NDEE Offices
- 9:30-11:30am
- Lunch provided after



- **MEEA Member and Prospect Happy Hour**

- Barry's Bar and Grill
- 4:30-6:30pm
- Snack and drinks on us!

