



Building Science



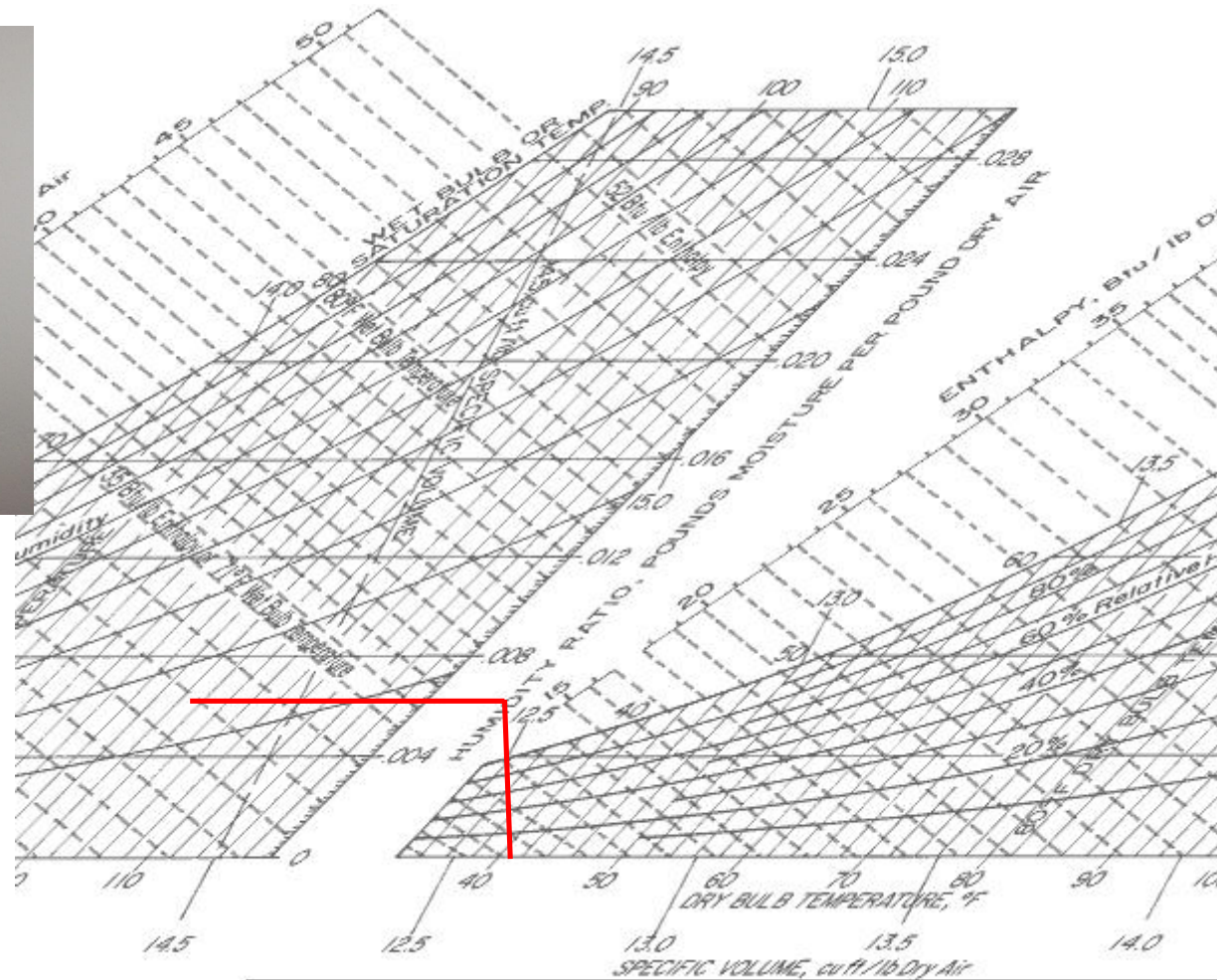








Psychrometric Chart





(almost) All you need to know

- Which way does heat move?
- Which way does moisture move?
- Which way does air move?
- Which way does gravity act?
- Which side of the wall is warm?

Building Science Corporation



Map 2: The Building America Hygro-Thermal Regions



Hilton Kalia Tower



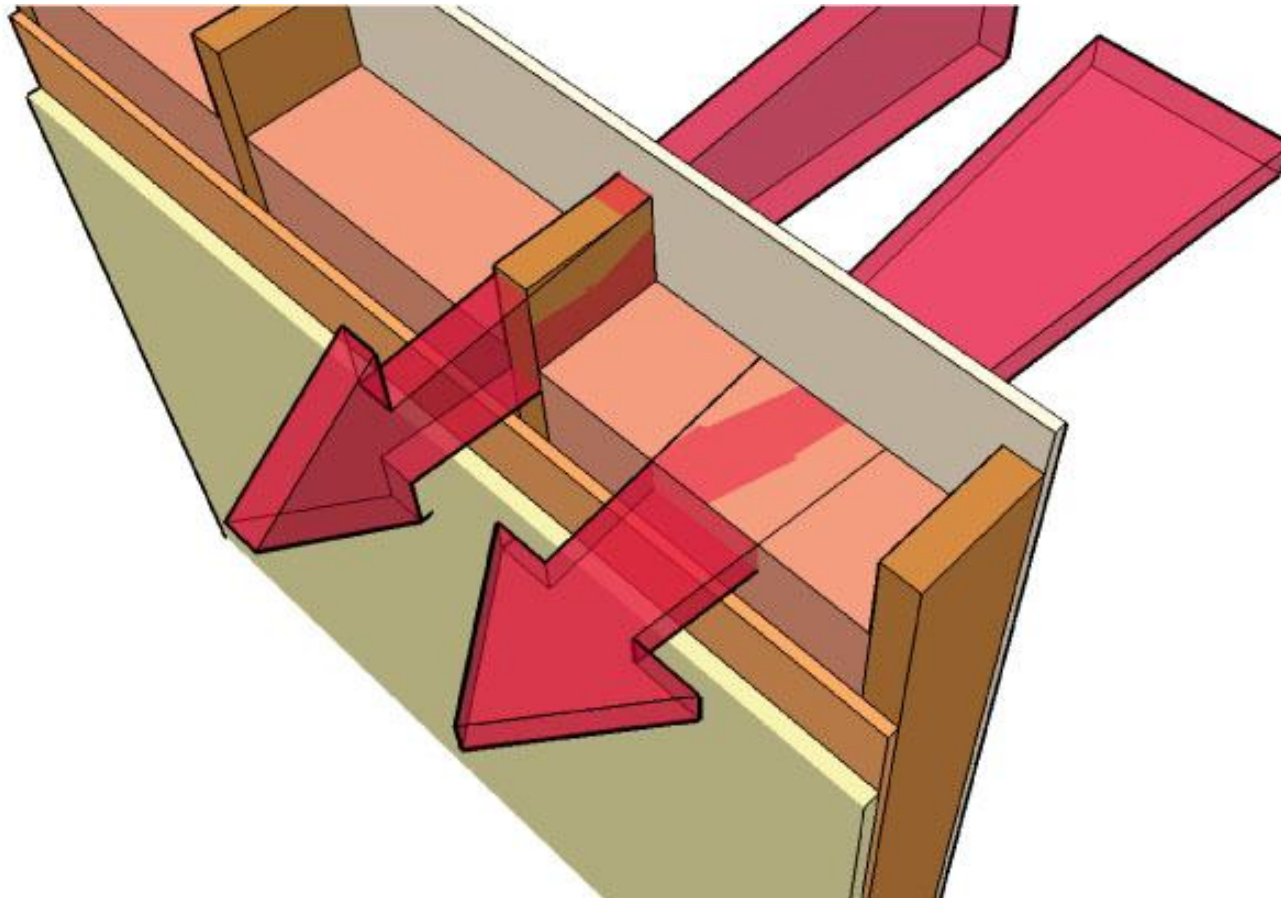
**\$95 million to
construct**

**More than \$50 million
to clean up**

**\$1.8 million class
action suit from
guests**



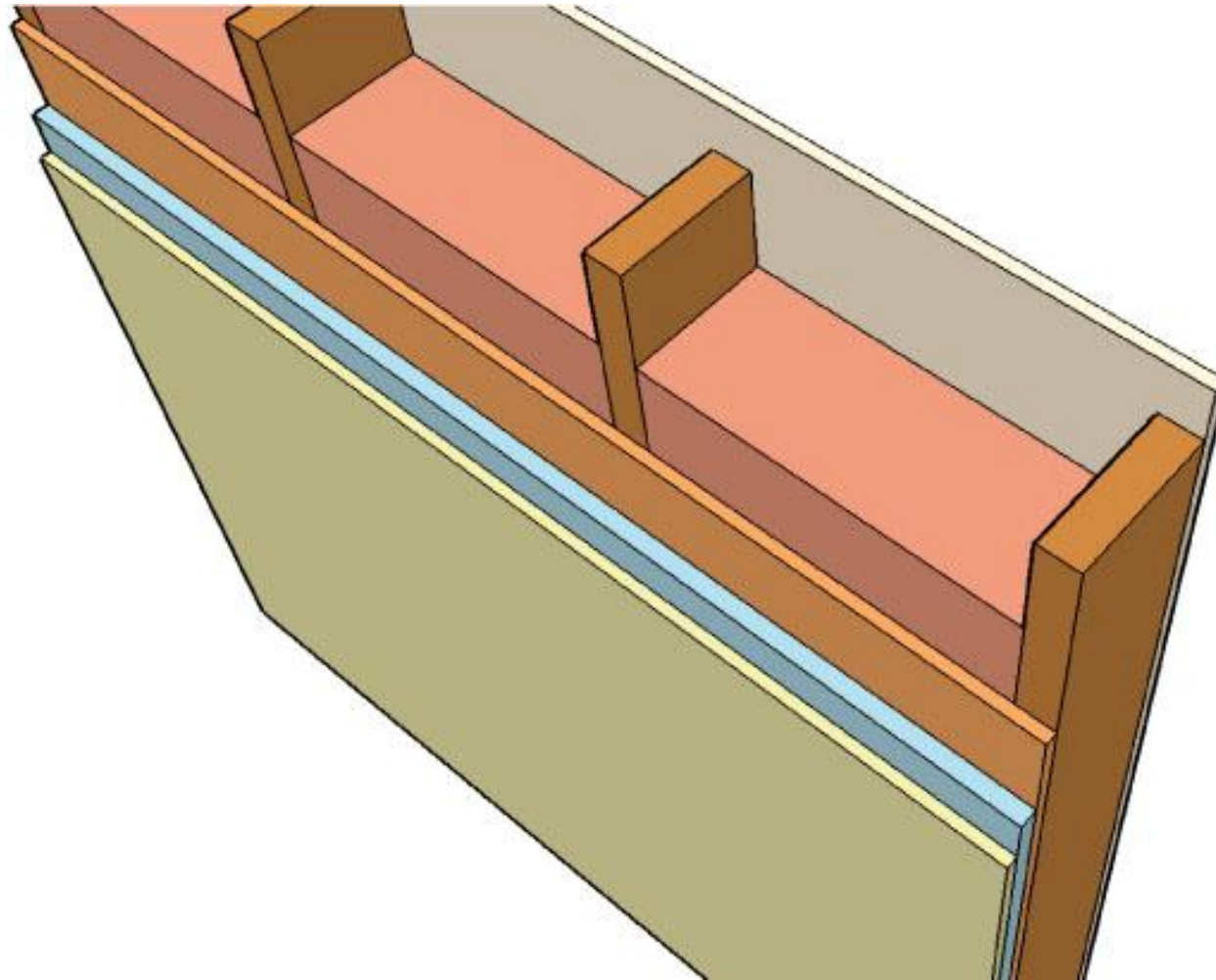
Series & Parallel Heat Flow







Thermal Break



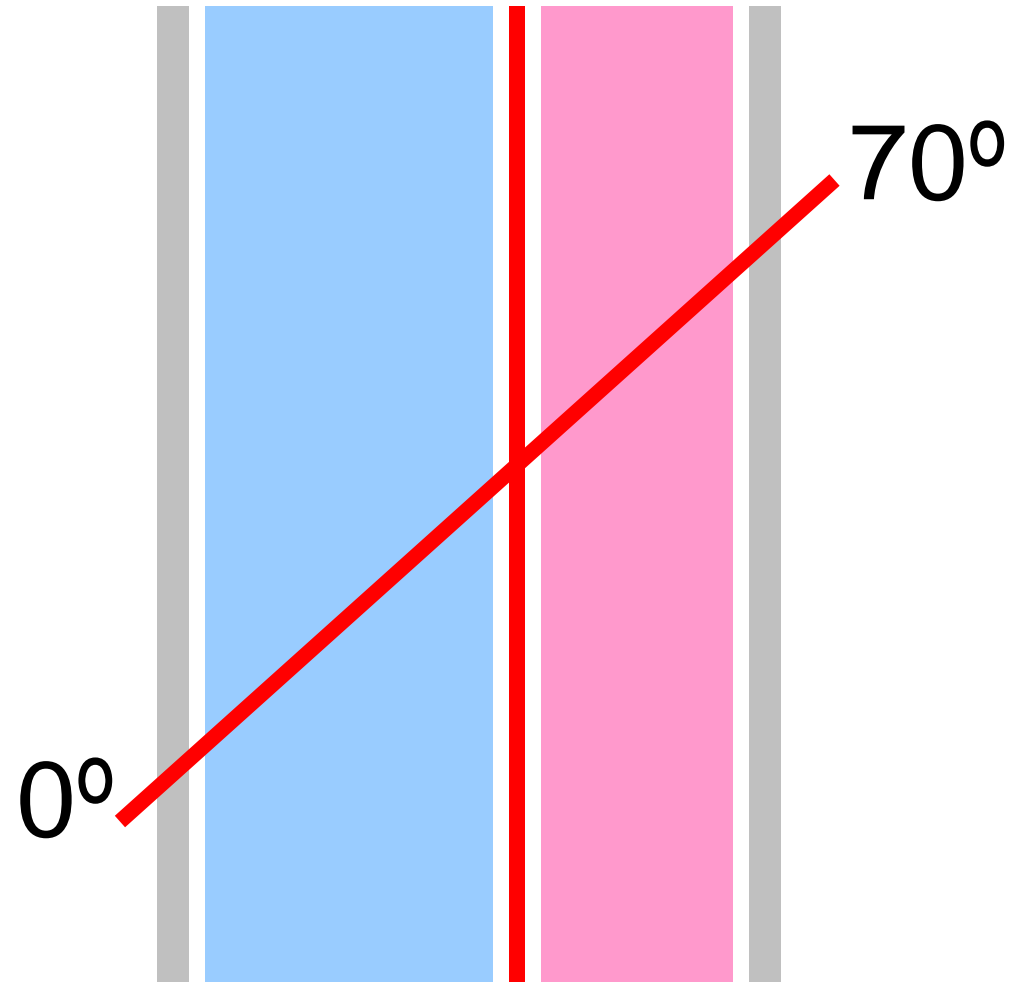






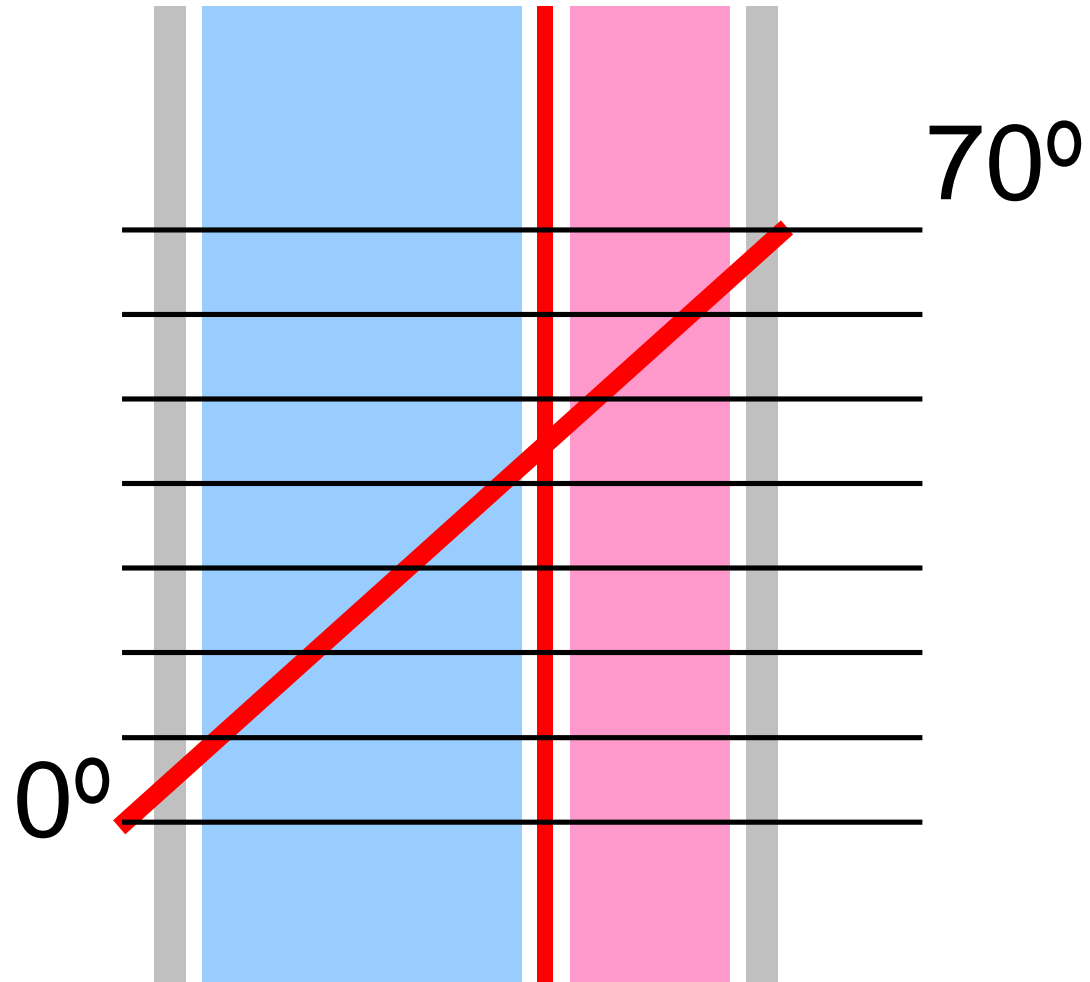


45° F





45° F



material	R-value	%total R	x °F	temp
before insulation warm side, gyp bd, etc.	1.5	3%	2	68
air permeable insulation 5" cellulose	19	44%	31	37
air impermeable insulation 3" closed cell foam	21	48%	34	3
after insulation cold side, siding, rain screen	2	5%	3	0
total	43.5	100%	70	

material	R-value	%total R	x ?T	temp
before insulation warm side, gyp bd, etc.	1.5	3%	2	68
air permeable insulation 4" cellulose	15.2	35%	25	43
air impermeable insulation 3.5" closed cell foam	24.5	57%	40	3
after insulation cold side, siding, rain screen	2	5%	3	0
total	43.2	100%	70	

material	R-value	%total R	x ? T	temp
before insulation warm side, gyp bd, etc.	1.5	3%	1	69
air permeable insulation 5" cellulose	19	44%	17	51
air impermeable insulation 3" closed cell foam	21	48%	19	32
after insulation cold side, siding, rain screen	2	5%	2	30
total	43.5	100%	40	



Does 'R-value' matter?

$$Q = U * A * \Delta T$$

$$Q = \frac{A * \Delta T}{R}$$

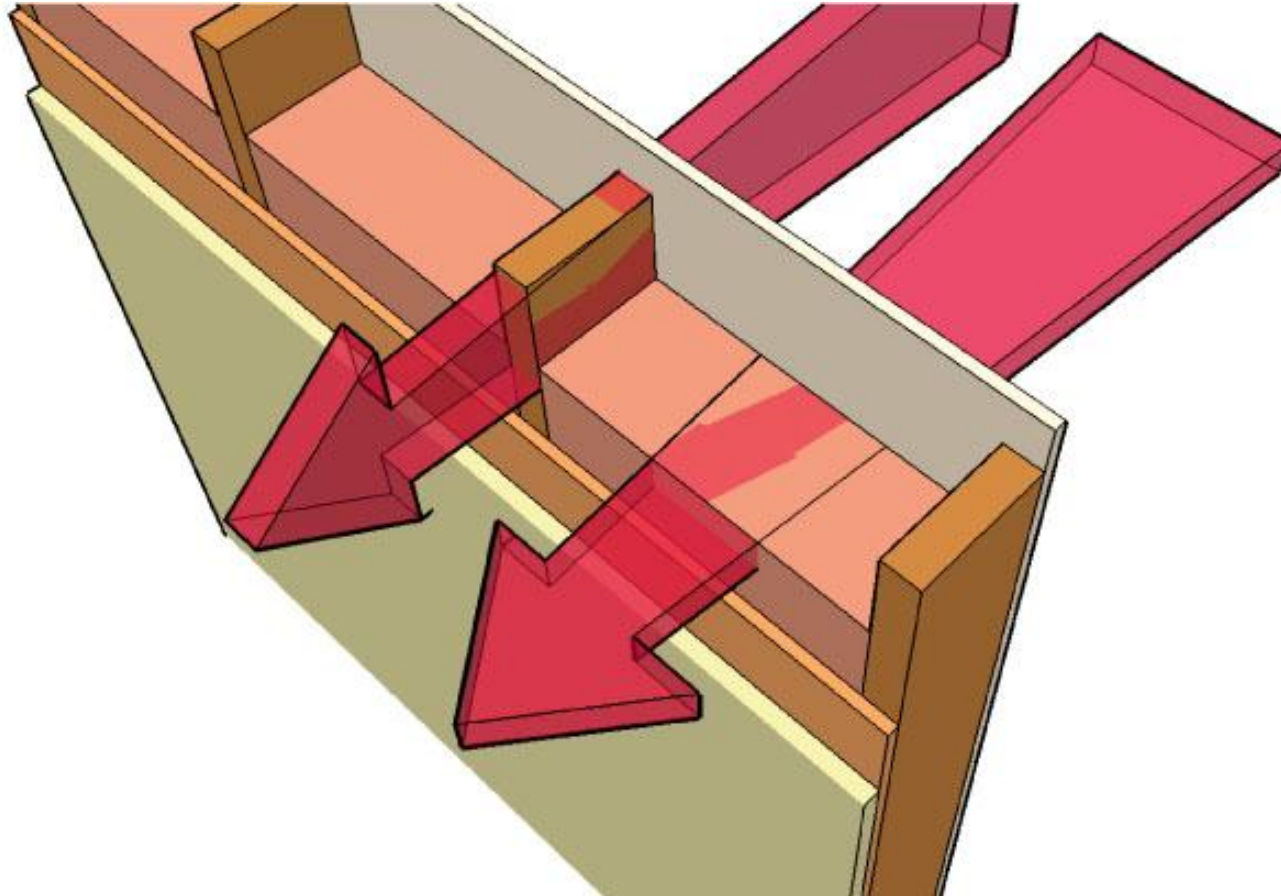


Which jacket has higher R-value?



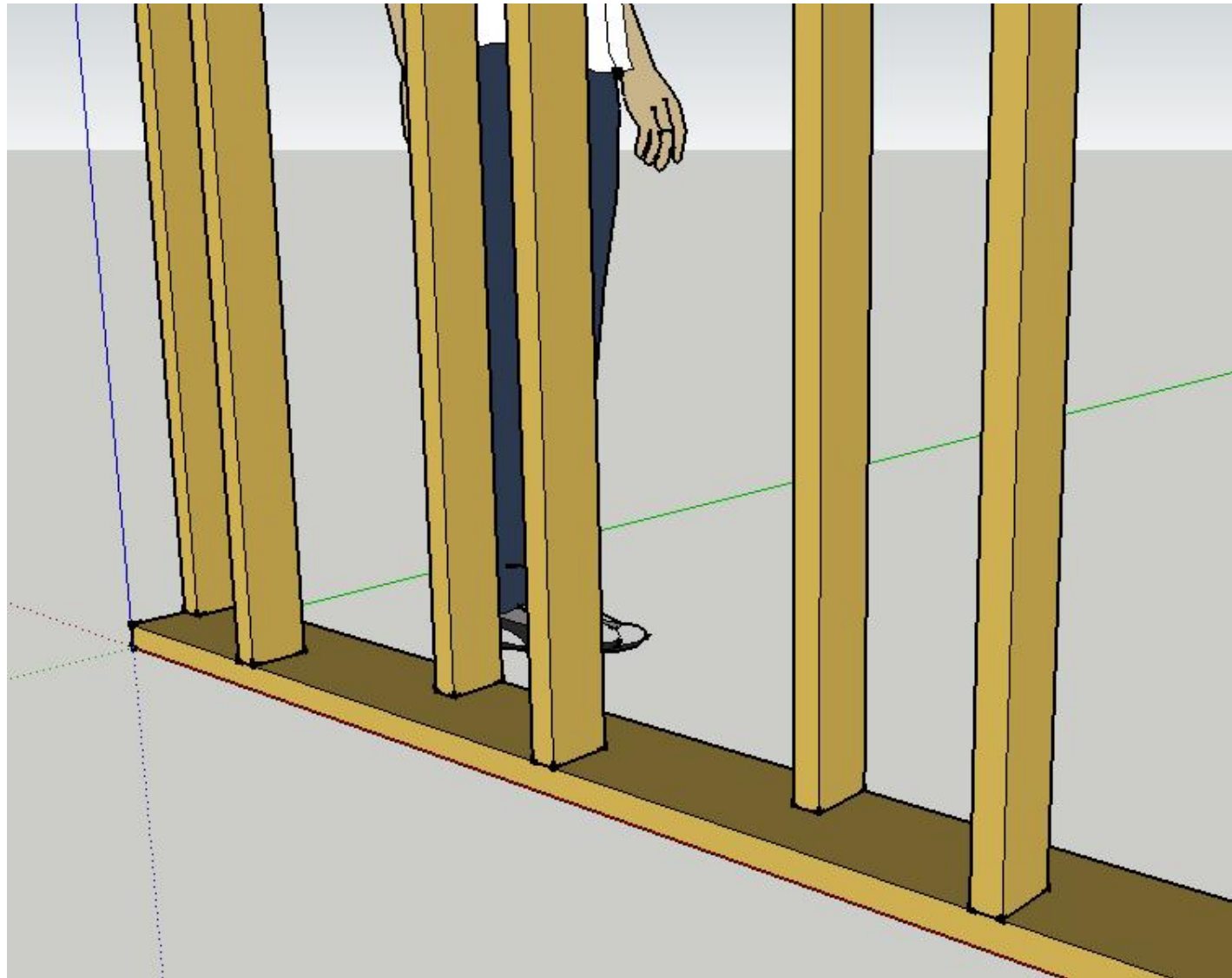


Series & Parallel Heat Flow



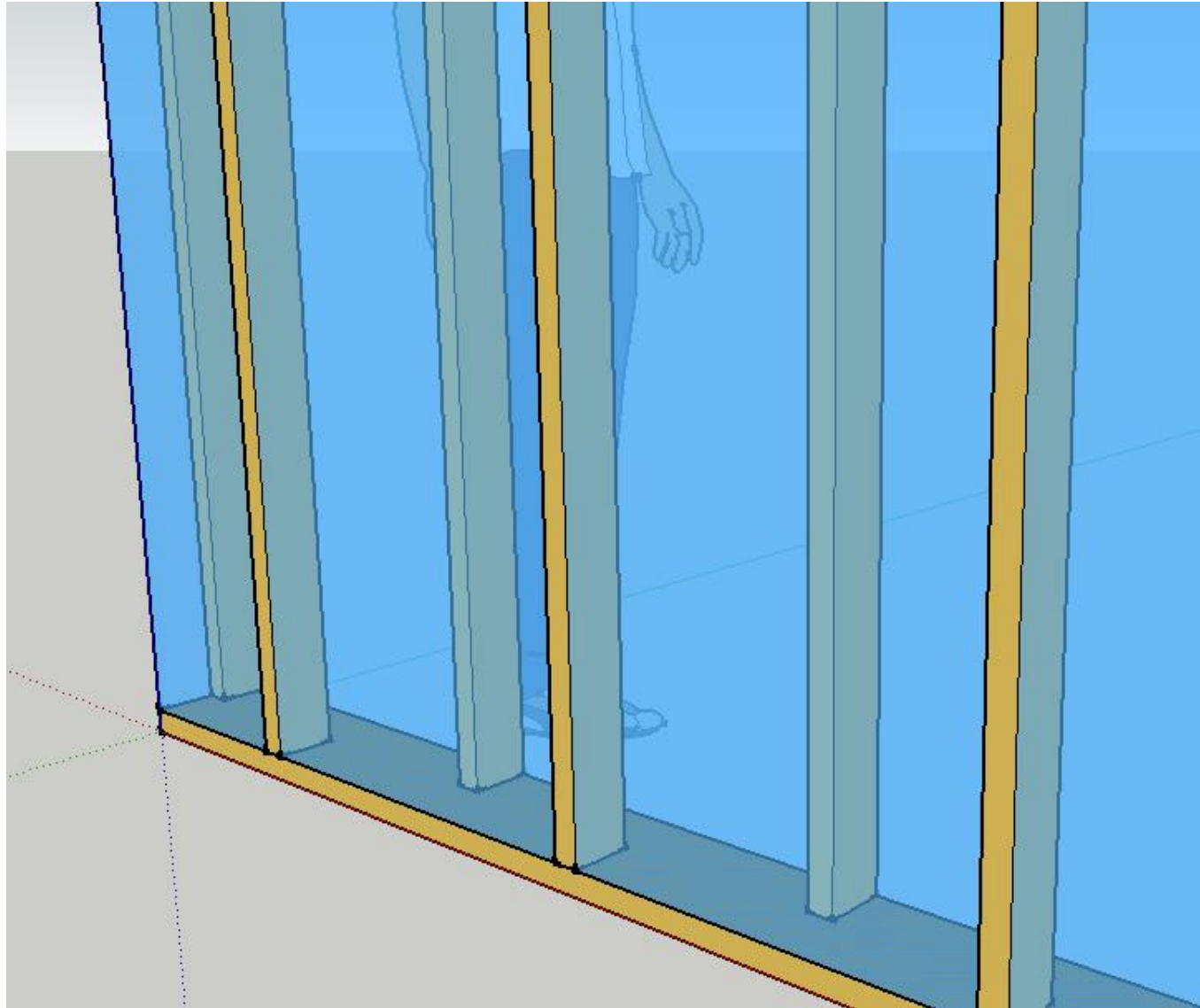


Offset studs reduce thermal bridging



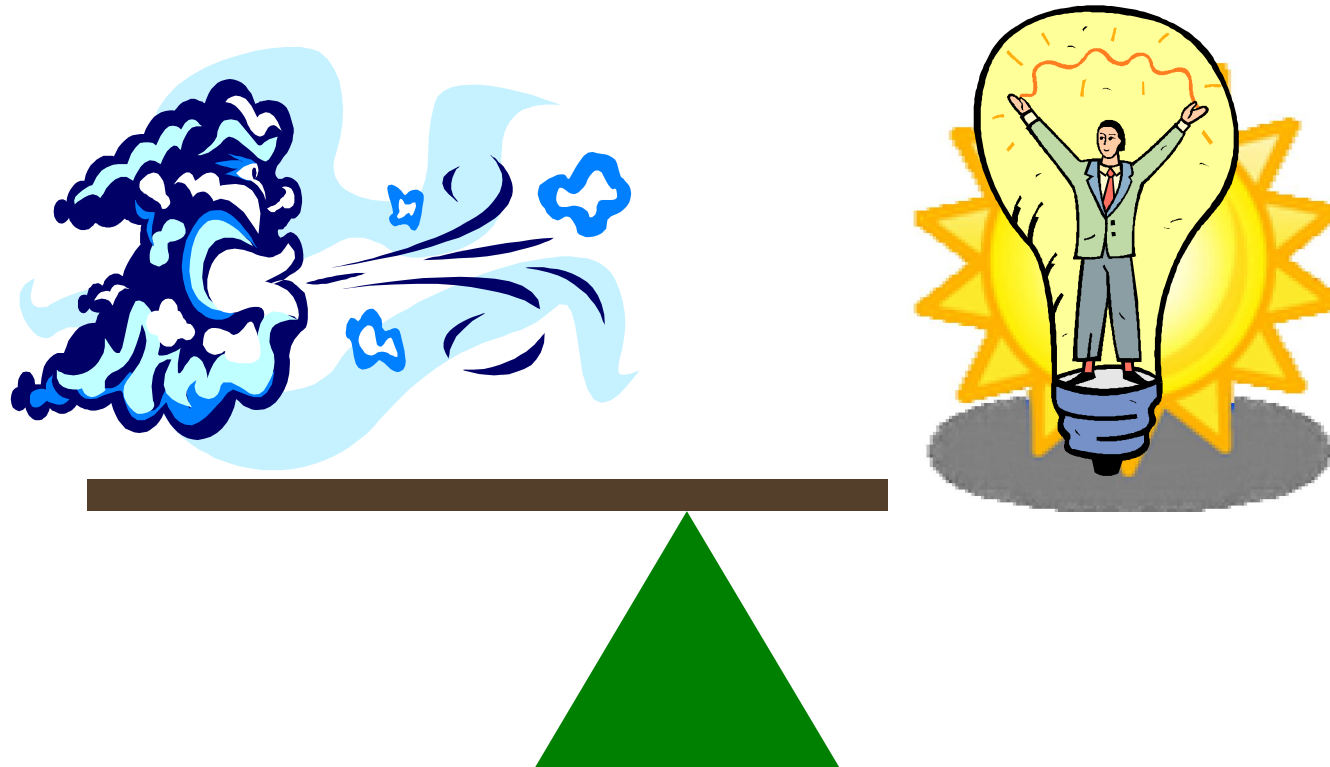


Foam fill





Balance Point Temperature





Why?

- Beauty
- Durability
- Comfort
- Energy Savings





Lunch & Busses

