



Tips, Tricks, and All the Other Things You Never Knew RED Could Do

November 6, 2025

Presenter

Kevin Scott
Community Development
Training Center Coordinator



RED Calc

Free Building Science Calculators for Residential Energy Efficiency Professionals

The Weatherization Assistance Program (WAP) and the Building Technologies Office (BTO) of the Department of Energy (DOE) have collaborated to purchase the RED Calc Free and RED Calc Pro web app software tools. The entire suite of tools is now free for all to use.

Tool Categories:

Ventilation Sizing | Airflow Measurement | Insulation | Domestic Hot Water | Moisture | Electrical Use | Weather Data

ASHRAE 62.2-2016 Ventilation

How or building construction (30000)

Dwelling unit is

Use infiltration credit

Current weather station

Weather and shading factor (1.0)

Floor area (1000)

Number of occupants

Dwelling height (10)

Measured leakage @ 50Pa (0.5)

☐ Use Advanced Blower Door Inputs

☐ Use Local Ventilation Alternative Compliance

Dwelling-Unit Ventilation Results

Effective annual air infiltration rate (0.05)

Total required ventilation rate, Q_{tr} (0.05)

Infiltration credit, Q_{in} (0.05)

Required mechanical ventilation rate, Q_{mv} (0.05)

Dwelling-Unit Ventilation Run-Time Solver

Fan capacity (0.05)

Run run-time per hour (0.05)

Dwelling-Unit Leakage Rate Solver

Target mechanical ventilation rate (0.05)

Corresponding measured leakage @ 50Pa (0.05)

www.pnnl.gov/redcalc

Zone Pressure Diagnostic

Zone label

Blower door test type (Type 1)

☐ Use Advanced Inputs

Initial Zone Configuration

Pressures (Pa)	BD off	BD on	AP
House wrt outdoor	0	Sign negative	
House wrt attic	0	Sign negative	

Blower door flow adjusted to 50 Pa (0.05)

Zone leakage: 0.05 (0.05)

Modified Zone Configuration

Indoor/outdoor pressure between zone and outdoor

Type of modification: 0 (0.05)

Pressures (Pa)	BD off	BD on	AP
House wrt outdoor	0	Sign negative	
House wrt attic	0	Sign negative	

Blower door flow adjusted to 50 Pa (0.05)

Results for Initial Zone Configuration

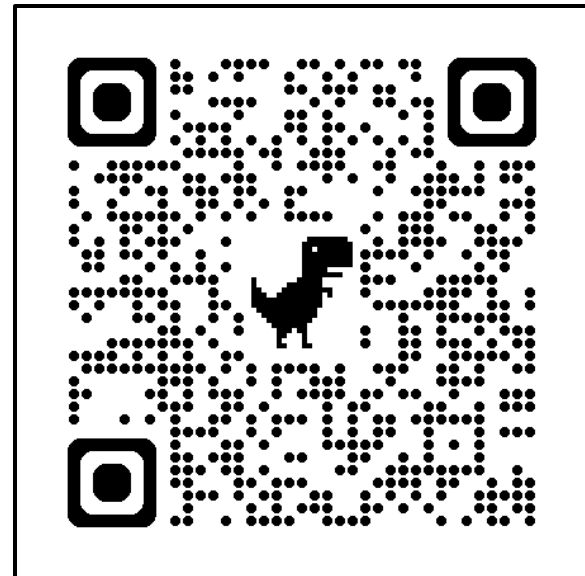
Leakage @ 50Pa	Leakage area
Zone-to-outdoor	
Zone-to-attic	
Zone-to-outdoor	
Through zone	

Percent of whole house leakage passing through the zone =

www.pnnl.gov/redcalc



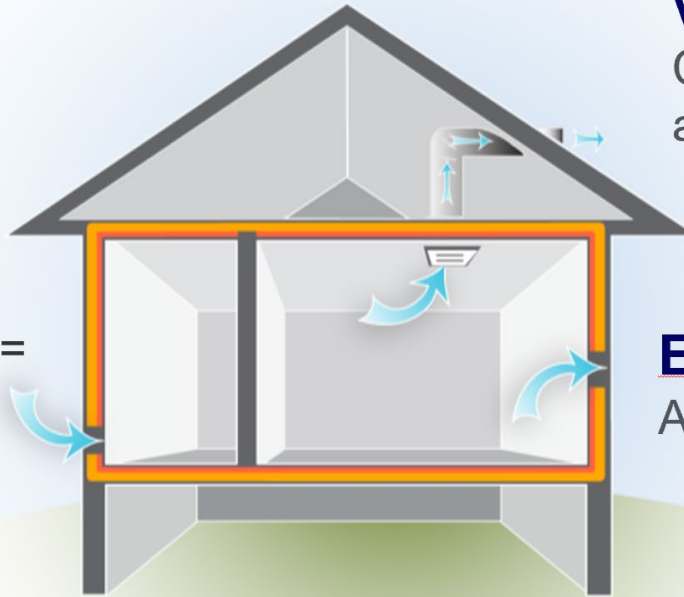
<https://basc.pnnl.gov/redcalc>



Passive Ventilation: uses natural pressure differences across a building's pressure boundary

Mechanical Ventilation: uses a mechanical fan to move air in or out across a building's pressure boundary

Infiltration =
Air leaking in.



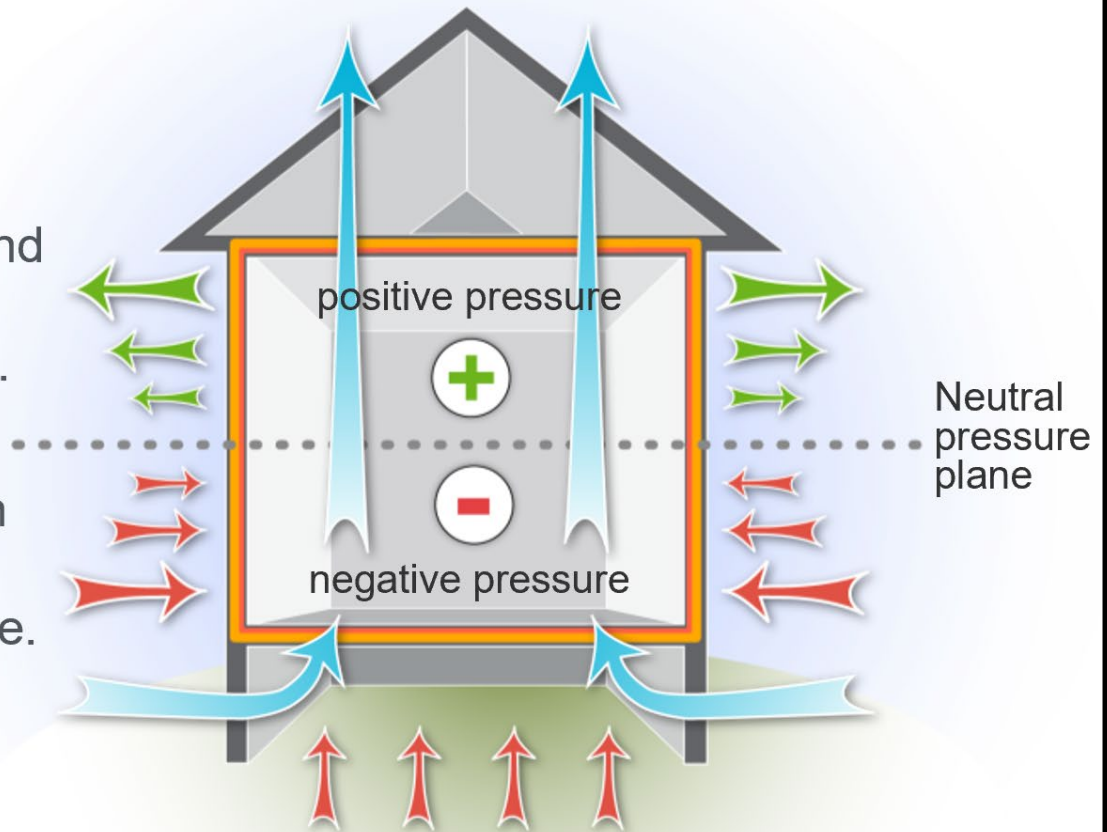
Ventilation =
Controlled
air leakage.

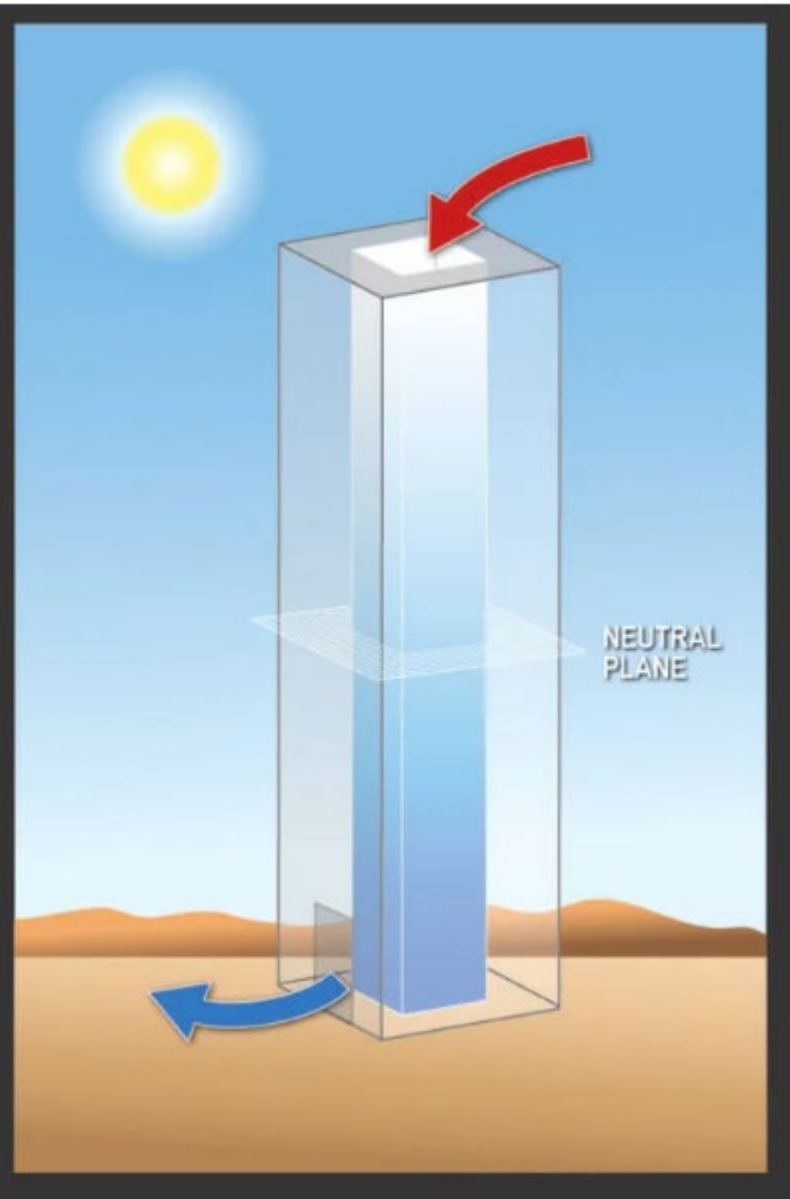
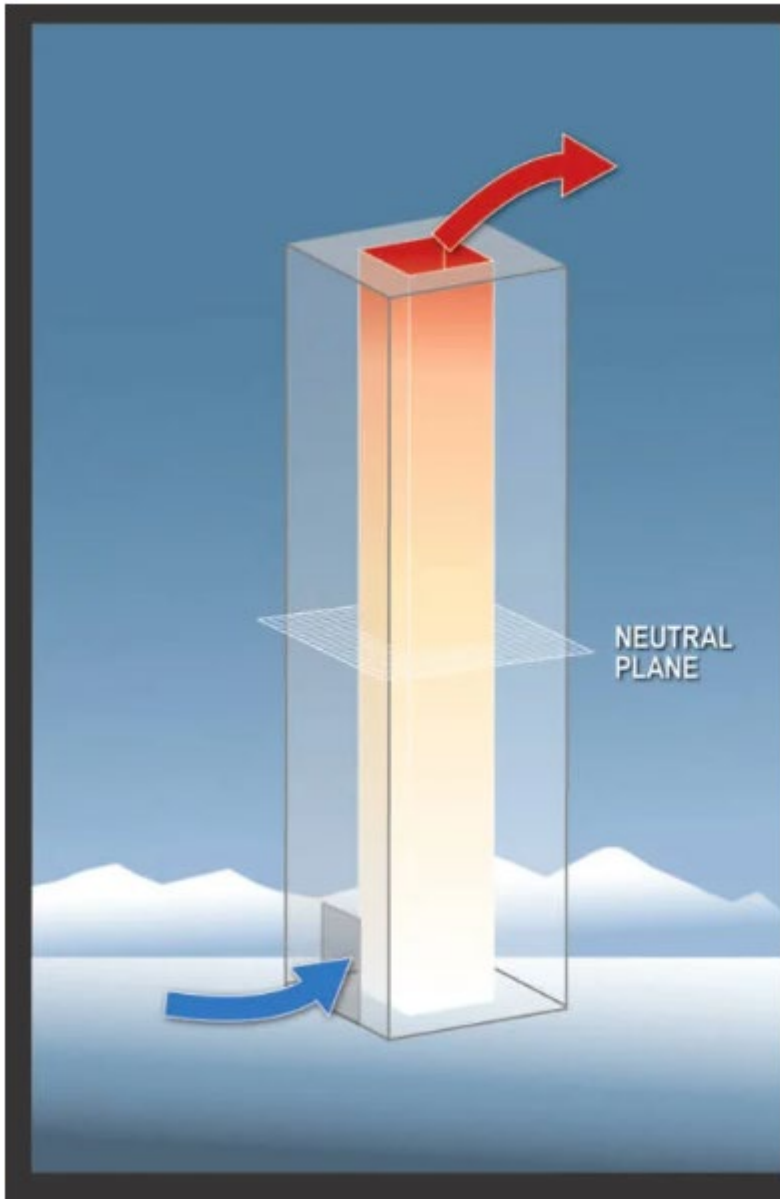
Exfiltration =
Air leaking out.

Stack Effect

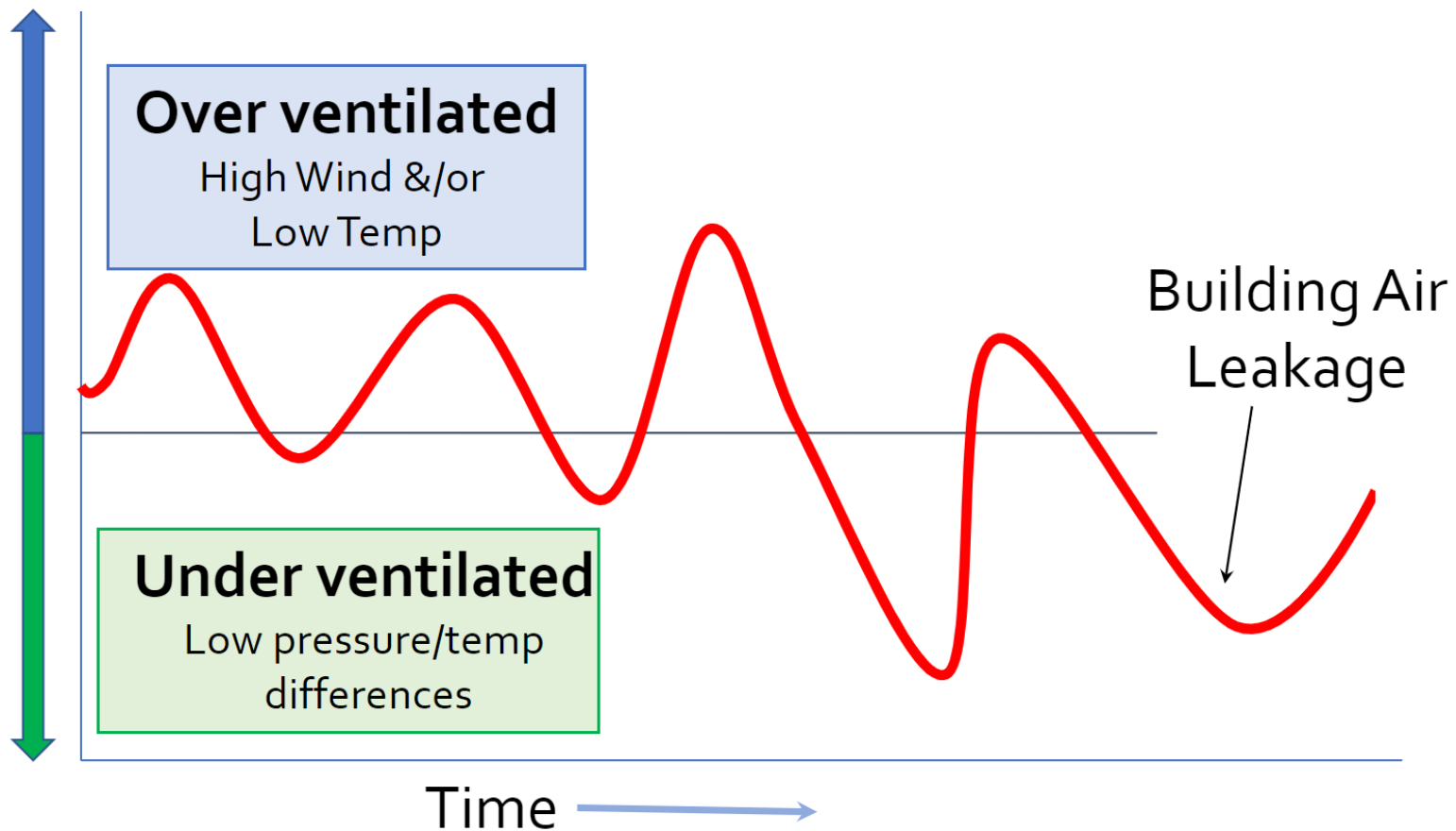
Warmer air rises and escapes out of the top of the house. . .

Which creates a suction that pulls in outside air at the bottom of the house.

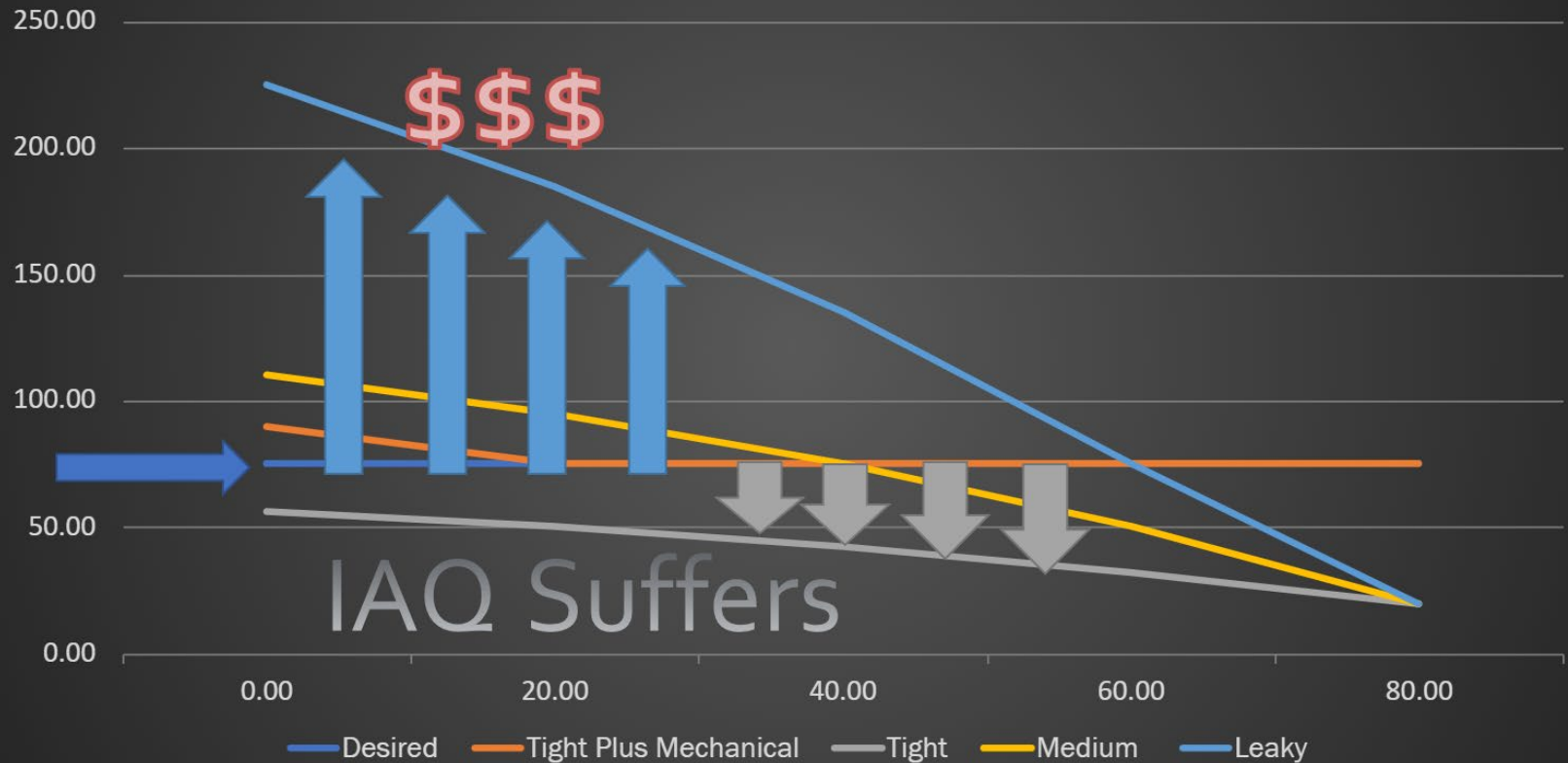




Passive Ventilation is Uncontrollable & Unreliable



CFM Natural vs. Outdoor Temp





Questions?

Contact Information:

Kevin Scott
Community Development
Training Center Coordinator
kscott@ptrc.org



Megan Meadows
Weatherization Senior Program
Manager
mmeadows@nascsp.org

