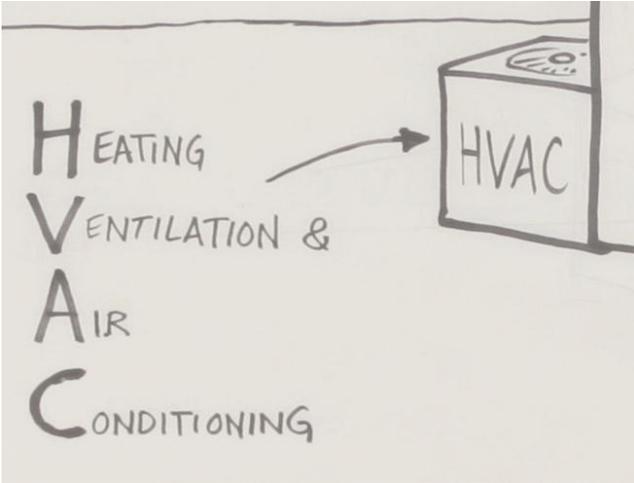


Net Zero Energy Buildings: Efficient HVAC Design

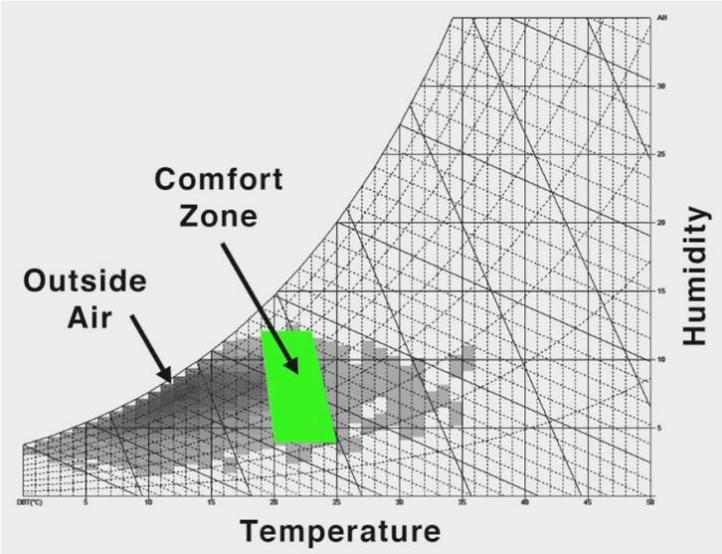
Companion to the video: Script and Illustrations

As we move along the path to a Net Zero Energy Building, we can vastly lower our energy demand using passive strategies. But it may not be enough.

If you can't entirely achieve thermal comfort passively, you'll need to make up the difference with active HVAC systems.



People's thermal comfort mainly depends on temperature and humidity.



When outside air is too hot
or too cold,
or the humidity is too low
or too high,
you'll have to condition the outside air as you bring it into the building.

Of course, people also need fresh air.

And air circulation plays a key role in thermal comfort too. Moving air can help people feel cooler, even if the temperature is higher.

But you can also use other forms of heat transfer besides air to improve efficiency.

Radiant floors, panels or beams are usually heated or cooled by liquid; then they radiate energy directly to people and objects, avoiding the need to heat or cool all the air in the space.

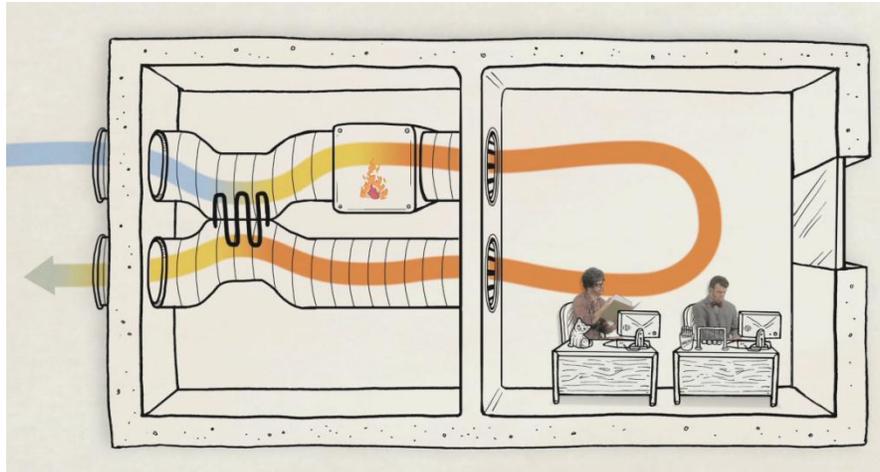
No matter what equipment you use, you want to size it correctly and choose components with the highest energy efficiency ratings.

For instance, heat pumps are rated by Coefficient of Performance, or "COP". It's the amount of heat energy moved, divided by the energy used to move it.



It's also important to optimize the whole system, and not just its parts.

For example, don't throw away the energy you already spent heating or cooling the inside air when you bring in fresh air. Heat exchanging systems can recover that heat, coolness, or even humidity before the air's exhausted.



And remember, the better controls and feedback you have, the more you can save energy while still keeping people comfortable, as both the weather and building use changes.

So keep looking for passive strategies... Those will get you a long way on your path to Net Zero Energy Buildings.

But smart active strategies are often needed to get you all the way there.

It's the combination of the two that makes Net Zero Energy Buildings achievable!