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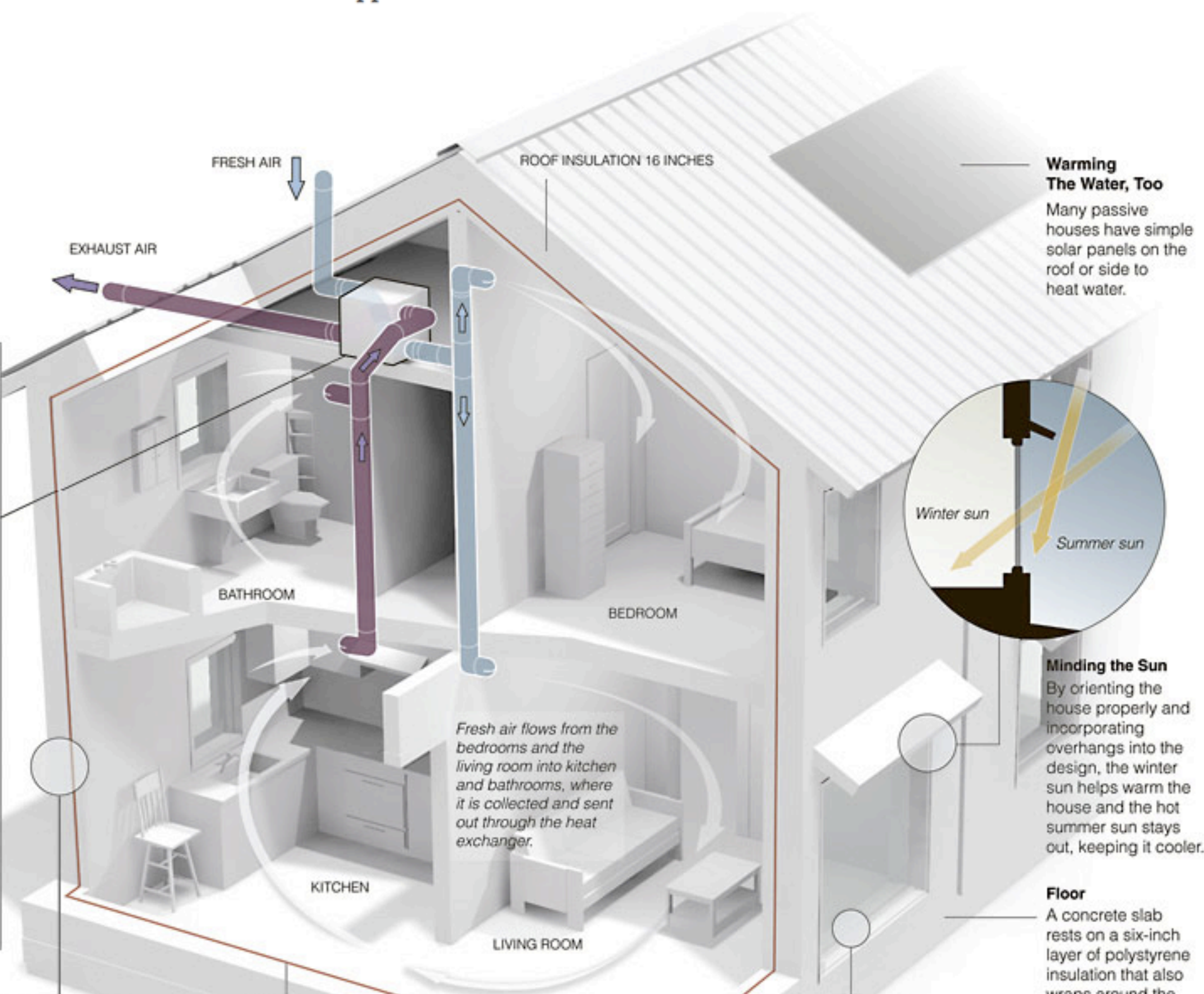
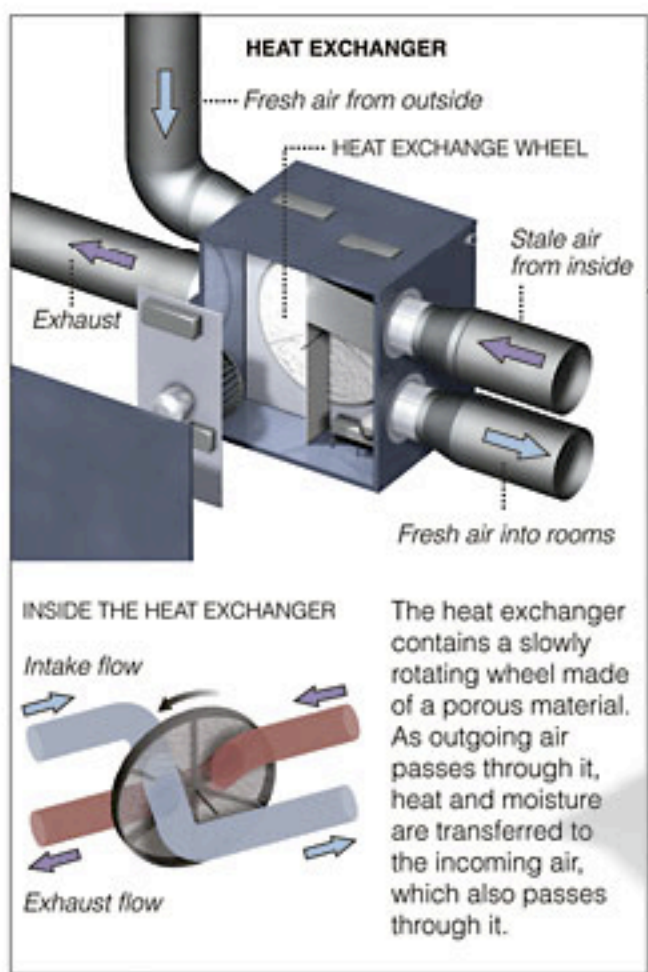
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Snug and Tight

Passive houses are airtight buildings that use heat from appliances and even the occupants' bodies for warmth. They have thick insulation, are oriented to maximize winter sun and use a heat exchanger to warm outside air that circulates throughout. The result is a house that needs little or no extra energy for heating, even in very cold climates. While they are increasingly popular in Germany and Scandinavia, passive houses have yet to make inroads in the United States. Here is one approach.

At the Heart, A Heat Exchanger

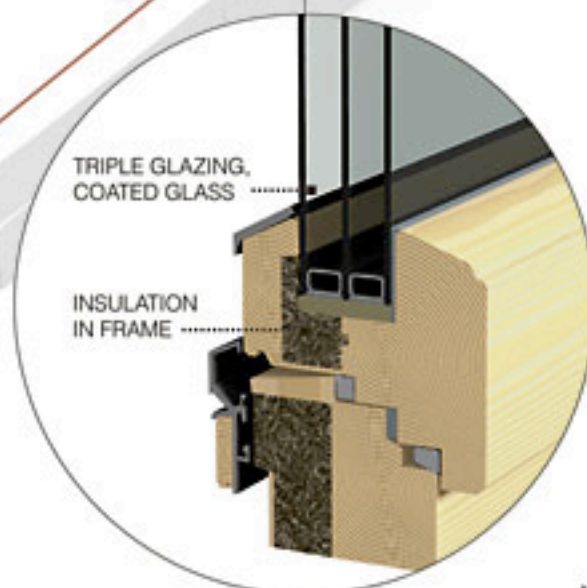
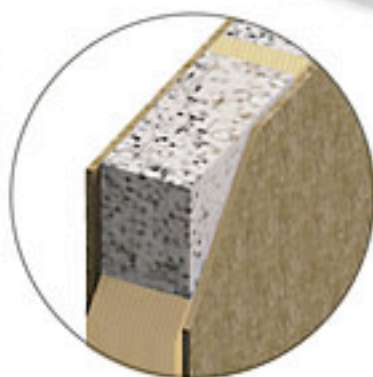
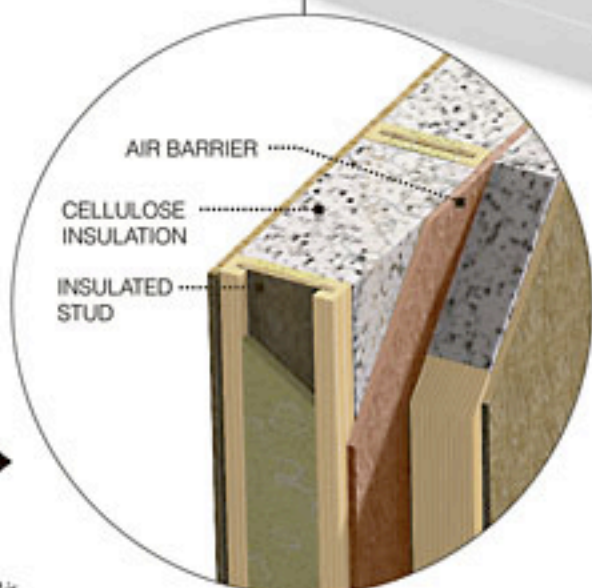
The most important element in keeping a passive house warm is the heat exchanger, which uses heat from inside air to warm fresh air from outside. Stale air is constantly being replaced with fresh air; about one-third of the house's air is replaced every hour.



Keeping the Heat In

Exterior walls are two or three times thicker than those in a conventional house and are well insulated, with the amount of insulation varying by climate. A double-wall system is used, with a continuous air barrier between the two walls. Walls and studs are designed to minimize heat conduction.

PASSIVE HOUSE WALL, 12-INCH TOTAL INSULATION



Sources: Passive House Institute U.S.; UltimateAir

MIKA GRÖNDÄHL/THE NEW YORK TIMES

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