



LOW ENERGY VENTILATION

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outside air and polluted inside air.

Energy recovery ventilation systems provide controlled ventilation while minimizing energy loss. They reduce the costs of heating ventilated air in the winter by transferring heat from the warm inside air being exhausted to the fresh (but cold) supply air. In the summer, the inside air cools the warmer supply air to reduce ventilation cooling costs.

Heat pumps can be an energy-efficient option that combine heating, cooling and a healthy air exchange natural system.

Ventilation for Cooling

Ventilation for cooling is the least expensive and most energy-efficient way to cool buildings. Ventilation works best when combined with techniques to avoid heat buildup in your home. In some climates, natural ventilation is sufficient to keep the house comfortable, although it usually needs to be supplemented with spot ventilation, ceiling fans, window fans, and—in larger homes—whole-house fans.

Ventilation is not an effective cooling strategy in hot, humid climates where temperature swings between day and night are small. In these climates, however, natural ventilation of your attic (often required by building codes) will help to reduce your use of air conditioning, and attic fans may also help keep cooling costs down.

Websites on ventilation can be found at www.greenenergytimes.net/ventilation-links/

EFFORTLESSLY GROWING PLUMS IN VERMONT

By David Fried

Everyone is planting gardens. But who is planting fruit trees and nut trees?

While you have to plant a garden every spring, you only plant a fruit tree or a nut tree once, and it bears fruit for a long, long time. Let your tree's roots mine the moisture and nutrients it needs, while you have more time to play with your kids, to write a book or hike a hill.

Real permaculture is seeing what you can do in your yard and on your hill to feed yourself and your family and using that wisdom throughout your life. Living with fruit and nut trees, they will teach you as you go. Don't be hesitant. Start planting. Be fruitful. And we will coach you along the way...

If you are walking next to me in late August and September, your shirt will be ruined.

These hills are a place where plum trees grow and when they are ripe. The plums are so juicy that one bite sends their mango-like nectar spurting over whatever you are wearing, so watch out.



Would you like to taste a golden plum? A red one? A purple one? We have them all. Let me tell you how they got here to our northern Vermont farm.

In 1979 I was hiking the Long Trail north and lived on fruits and berries. When I came down from the mountains, I was offered a place to live and I started

planting fruit trees. The local extension

inner protection from cold and wind and

agent told me that I could only grow apples here, and only a few kinds. But I was a rebel! I started fruit exploring. If I saw an unusual fruit at a farmer's market, I would ask the grower what it was and where did he or she get it? In this way, I got some cuttings

of plum trees and pear trees from them that had been growing in the same area as I was living, and had proven they could make it here.

I had to learn to propagate these cuttings by grafting. Then I had to be patient, as it can take five to seven years for a new baby tree (made of only two buds) to give its first fruit. Now, 35 years later, we have had many plantings of plum trees all over our hills and they continue to blossom and fruit and tantalize my taste buds.

The plums you find in stores are large, hard and picked before they are ripe (so they keep well as they come across the country and sit in boxes). The ones you and I can grow here were developed by skilled pioneers who also lived in the north country. Professor S.E. Hansen in South Dakota, Professor Brian Smith in Wisconsin, and Professor Elwyn Meader in New Hampshire all introduced new plum varieties. They were natural crosses of large, sweet but not-hardy-for-here, Japanese varieties, with super-hardy local plum species. The results are some of the most exotic yet easy-to-grow fruits we have.

They have names like "black ice," "kahinta," "la crescent," "cocheco," "toka." You are keeping the stories alive by planting, growing, eating and sharing them.

One of the secrets we have rediscovered is that plum trees like to grow rather closely in "plum thickets." Whether or not you plant them this way, they will seek to establish their own closely growing group by sending up "plum suckers" in every which way. You can easily "steer" them by mowing or lopping.

My hypothesis is that within a tight group, their flower buds have enough



some of their fruit has enough camouflage to elude the plum curculio beetle.

It works, and we get thousands of plums without any sprays. We do sing to them. And give them 'high-fives' from time to time.

If you don't have enough time or enough friends to eat them all fresh, you can freeze them whole to make jam or pies or sauce later. We like to dry them in a dehydrator, simply split with our fingers and laid out on the trays. They keep for a long time like this and taste more like dried apricots than prunes.

We have been growing plums successfully in northern Vermont and you can too. You can pick almost all of them from where you are standing on the ground. They often look like a Zen garden and when they are in blossom, all is right with the world. You may want to have a picnic table or a loveseat among your plum grove, for you will be spending some good days out here. They give you an outdoor place where you can feel right at home.

Anyone moving toward sustainability though permaculture can benefit a lot by planting fruit trees. They take time to get to harvest, so planting them should be done as early as possible. If you want to plant them this year, it is best to start planning now.

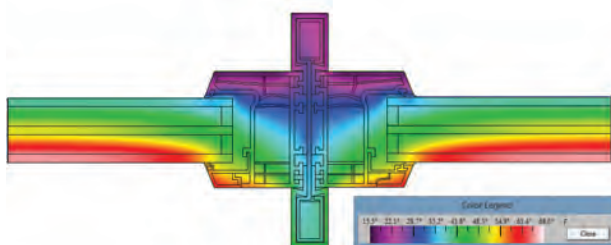
David Fried will be sharing his thoughts in this column to share tips and proven techniques that will help us all to get on that path to Permaculture. He is the founder and grower of Elmore Roots Fruit Tree and Berry Nursery in Elmore, Vermont. Visit elmoreroots.com or call (802)888-3305 to reach him.

MORETOWN'S SECOND PASSIVE HOUSE

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determined in the building code for each climate zone, or by back venting below the roof deck. When I modeled the proposed unvented roof, WUFI-ORNL indeed predicted that the assembly would not be able to dry out and therefore the moisture content in the building materials would slowly rise over the seven year period that I analyzed. I compared this assembly to a back vented assembly. The results were dramatic. With only 1 ACH in the back venting plane, the roof assembly showed a significant dry-out over the seven year period. Based on these results I advised my client to add a ventilation plane to the roof assembly.

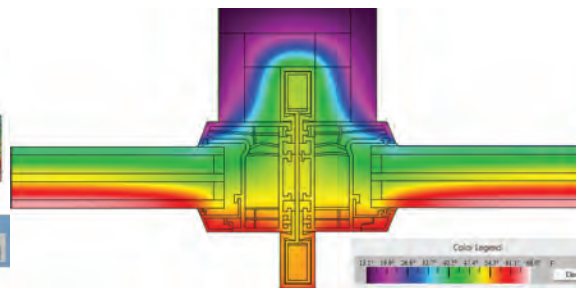
The final step in the design is to look for potential thermal bridges and either eliminate them, or account for them in the PHPP. Thermal bridges that can't be eliminated need to be modeled in a two-dimensional heat transfer program such



THERM simulation of our window mullion thermal bridge in plan view.

as THERM, which is free from the Lawrence Berkley National Lab.

Our biggest thermal bridge concern was our window connection mullions. To determine if they were a thermal bridge I first drew them in THERM with the window frame geometry. Then THERM runs a heat transfer simulation with and then without the mullion. The conductance of just the mullion is determined by subtracting



THERM simulation of our insulated exterior trim solution.

the results with the mullion from those without the mullion. This number is entered into the PHPP. The mullion thermal bridge ended up throwing off our energy balance and was a condensation risk. We used THERM again to determine that an exterior trim piece that incorporates an EPS foam plug significantly improves this thermal bridge.

I enjoy being able to bring the precision of the PHPP, WUFI and THERM to the design process. Informed decisions instead of best guesses become the basis for a Net Zero-ready design fit for the 21st Century.

Indigo Ruth-Davis is a Passive House Institute US Certified Passive House Consultant and builder. He is a partner at Montpelier Construction, one of central Vermont's leading building performance companies.

Black Magenta Yellow Black