



Energy Co2 : Energy Efficiency

Heat Images: Is Your Home Leaking Money?

Many ways of reducing energy costs are expensive. But there is also great potential for cost-effective improvements to be made in buildings. Energy consultant Christoph Lehner explains how to find the leaky spots and why heat images can do the trick.



Christoph Lehner, Energy Consultant

"Many renovations are only superficial and people stop at a level of insulation that is just not good enough." (Photo: Lehner)

You use heat images to uncover energy sins. How do they work?

Thermographic cameras measure the surface temperature of buildings. Depending on the camera, an image can contain up to 400,000 measurements. Every measuring point is displayed using a specific color; red usually signifies warmth and blue cold. The sensors can detect temperature differences as small as 0.05° C.

Thermographic images are useful for every kind of building, but you should definitely take them before renovating a building, so you'll know where the leaky spots are.

What kind of energy sins do you detect with such images?

The worst energy sins are those where no one is responsible. A typical example is the place where the wall and the roof link to each other. The bricklayer stops at the top of the wall; the carpenter doesn't care what's below the roof truss. The weak spot is where the two structural components meet.

You can easily spot such heat bridges on the heat image of an outer wall; they appear as red spots, because warmth leaks from the building. Inside the building it's the other way around. It will get cold where warmth leaks out and you can see this as a blue spot on the heat image.

Many buildings are also insufficiently insulated. Many renovations are often superficial. People stop at a level of insulation that is just not good enough.

How can home owners improve the energy efficiency of their

building?

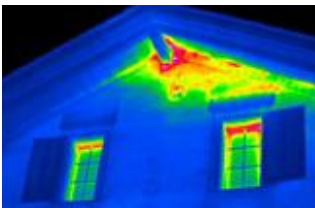
I always take a number of images from the inside and outside to get a clear idea of what is needed. Quite often you can't judge a roof from the outside, because cold air ventilates behind the roof tiles. If there are lots of leaky spots, I usually suggest re-insulating to make the roof airtight again. Leaky spots waste a lot of energy, and they increase the risk of structural damage.

If you mend all these leaky spots, you can easily reduce your energy costs by 10 to 20 percent. That's quite a bargain, and you can easily do it yourself. But it's not enough to use insulating foam—it's not airtight and it shrinks with time. After a while, cracks appear, and with them a draft. It's better to use silicon, adhesive tape, foil, or special glue. Costs will be higher if you decide to insulate the entire roof or change the window panes.

How much energy and money can you save with better insulation?

Well, it depends on the building. New developments are usually well insulated, but old buildings are rarely up to current standards and their insulation should be improved.

The average house in Switzerland needs about 20 liters of oil per square meter; that is, you need about 20 liters of oil to keep one square meter of your house at a temperature of 20° C over one year. If you go for a full renovation, this figure can come down to 4 to 6 liters per square meter.



Picture Gallery (click on the image to start)

Heat images of some of the most widespread insulation problems (Photo: Christoph Lehner)

But I usually tell my clients that it's not just about money; it's also a question of comfort. If you have a well insulated house than the surface temperature of the inner walls will be higher. And the closer this surface temperature is to the temperature of the air inside your rooms, the more comfortable your living experience.

Just one example: Everybody knows the awkward feeling that you get when you sit with your back to a window pane. It feels like there's a draft, but there isn't. It's just that the air close to the cold pane cools down and starts to sink to the ground. The warmer the air inside your house and the colder the walls and windows, the stronger this effect will be.

What else can you do to have a more energy-efficient home?

If someone is willing to do a full renovation, it's usually a good idea to go for a ventilation system as well. A decent system consists of a heat exchanger and ventilators so you won't have to open your windows anymore. You can save up to two liters per square meter. In well-insulated buildings this can halve heating costs.

Many people are skeptical when it comes to ventilation systems, but

none of clients who have gone with them would ever go back. You can still open the windows, but most people don't even feel the need anymore, because the rooms are already well aired. And you also rid yourself of all the damage caused by dampness in the bathroom, because all the humid air is siphoned off.

Has demand changed in recent years? Does the energy price make a difference?

In Switzerland demand has picked up in recent years, mainly because we have a type of climate tax. For every liter of oil sold the government takes one rappen that will later be used to fund green projects. So if you improve the insulation of your house you get some money from the government.

Many of my clients are also switching to wood-based heating systems. When it comes to oil, there are only a handful of refineries and they can easily dictate prices. With wood, there are hundreds and thousands of producers and you'll never see such a price cartel.

Are there still surprises after all these years in the business?

I once I got a call, because there was something wrong with the insulation in a roof. My clients wanted to know the cause of a problem and how of the roof would have to be opened to repair the damage. When I took a heat image, I saw one exceptionally warm spot right in the middle of the roof.

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At first I wasn't sure what to make of it, but then we realized that it must be a marten that had eaten a hole in the insulation and made its nest there. In the end, we knocked against the insulation and it loped off.

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