

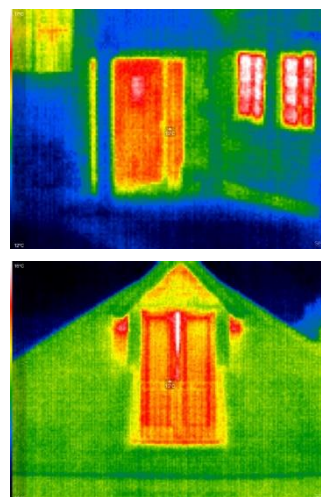
Why use Thermal Image Cameras?

In East Hampshire an average household emits approximately 4.5 tonnes of CO₂e¹ each year and a key goal at PeCAN is to help homeowners reduce that – at the same time reducing their energy bills and increasing the comfort levels of their home.

For most homeowners, heating will be the largest contributor to their energy bills during the winter months. This is because when it is cold outside all houses lose heat through the roof, walls, floor, windows, and doors. How much heat is lost drives how much heat you need to produce to keep your home warm. So minimising heat loss is one of the most effective ways of reducing your bill.

But how can you determine where heat is being lost in your home? One approach is to undertake a thermal image survey. A thermal survey can help by identifying hot spots from the outside of your home or cold spots from inside your home using a thermal image camera.

Thermal surveys work best in the evening when the difference in temperature between the inside of a house and the outside is at its maximum – there needs to be at least a 10°C difference for the images to be useful.



Preparation

Ensure your heating is on for at least 8 hours before you carry out the survey – this gives the fabric of the building a chance to heat up, so that you get the best results from the camera.

Outside pictures can be taken if the weather is dry. You should note that any reflections (eg from windows) are likely to be reflecting the temperature of the sky (-40 degrees) rather than indicating any problems from the home. Trees or other vegetation are likely to be at the ambient (air) temperature. From outside the house we are looking for hot spots, which indicate heat leaking from the home.

Inside pictures can be taken regardless of the weather. You should concentrate on external walls, doors, windows and other areas where heat is likely to escape. If there are furnishings in front of a wall, these will show up on the camera at the ambient (air) temperature of the room. Make sure the photo does not contain a heat source such as a radiator, as this will skew the image.

Using the Camera

Our thermal camera is from a company called Seek Thermal. It plugs into your phone or iPad and is operated through an app that is free to install from the App Store. It is easy to use and similar in many ways to the camera on your smart phone.

There are a range of demo videos and tutorials on the company web-site:

- Demo video of connecting to phone: <https://www.youtube.com/watch?v=u8DE-0amOpU>
- Tutorials on website: <https://support.thermal.com/hc/en-us/categories/200090425-Seek-Compact-Series>

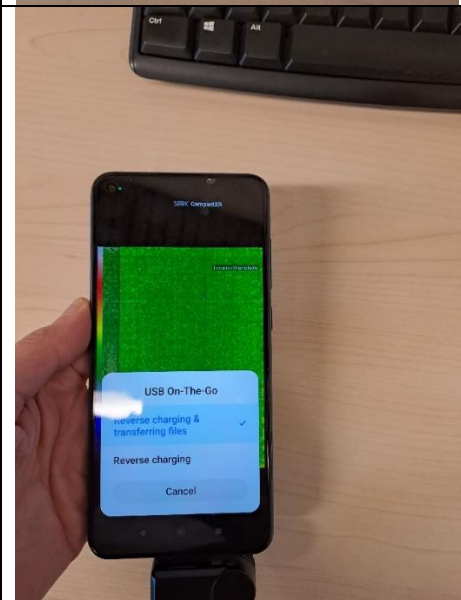
¹ *CO₂e stands for "carbon dioxide equivalent" and is a standard unit of measurement in carbon accounting. It expresses the impact of a number of different gases collectively as a common unit.

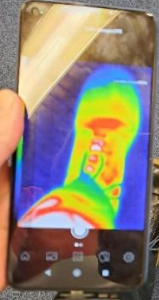
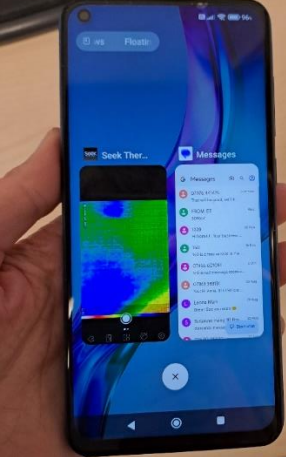
We have a recording of the training session we held in late 2022:

<https://www.youtube.com/watch?v=jBEXsmj6XZE>

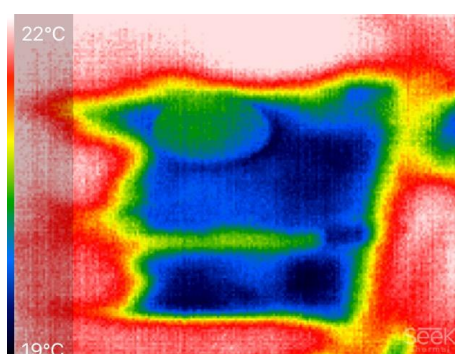
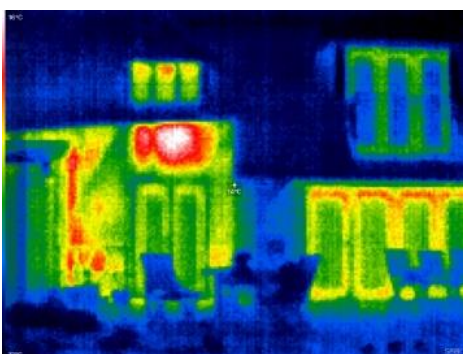
The camera is very easy to use and the default settings allow you to point and take photos easily. The camera will auto focus, and you should hear it clicking as it does so. Images are displayed in a colour palette that goes from (hottest) white, through red, yellow, green, blue and black (coldest). See the examples above. Pictures are saved with your photos and can be transferred, emailed or sent using messaging apps in exactly the same way as you normal photos.

The instructions below show the camera in use with an Android phone – but it works in a similar way on iPhones.

	The Seek Thermal camera plugs in to the USB-C port at the bottom of the phone. Make sure the writing on the camera is facing away from you (otherwise you will just be taking thermal selfies!)
	When you plug the camera into the phone, the Seek Thermal app will launch automatically. Select the “Reverse charging & transferring files” option when prompted.

	Point the camera at the item you want to view. The camera will effectively tell the temperature of the item it is pointing at. This picture show the thermal image of a foot and leg. The scale on the left side of the display shows the temperature range. The blue colour is coldest, then green, yellow, orange, red to white as the hottest colour.
	If the app stops working, disconnect the camera and shut down the app. You can do this by pressing the square button at the bottom of the screen, which shows the apps that are running. Then select the X to clear the app. You can then restart by plugging the phone in again.

When outside a building you are looking for hot spots – where heat is leaking out – red is bad. When inside a building you are looking for cold spots, where the heat is escaping – blue is bad.



From outside the building the hot spot caused by a radiator attached to an un-insulated wall is very clear to see. And from inside the building the cold spot in a bedroom ceiling where the loft insulation has been removed to adjust a light fitting is clear to see.

Always check the scale of temperatures on the left side of the screen – differences of less than 3 degrees are not significant, and may be down to artifacts with the camera or the operator.

If you have any further questions please contact patricia.exley@petersfieldcan.org or telephone 07398 411918.