Double Glaze Matters

SEP 2018

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Araluen Solar Panels

Energy This Month = .9Mwh = $200

Total Energy =31Mwh = $6,200

The Naked Truth Calendar

On sale to raise money for #StopAdani. $15 each or 5 for $50. Visit www.stopadanicalendar.weebly.com/shop.html

Franciscus Henri's contribution

Whirly Birds

I am often asked whether a Whirly Bird actually works. The idea is quite simple, by removing hot air from the ceiling space it makes the ceiling cooler and reduces heat entering the house.

My calculation showed that even using an exhaust fan, the amount of air moved is around .1 cubic metre /sec, giving a drop of 10% in ceiling temperature. A whirly bird is much lower air flow, resulting in at best a 3% reduction on a windy day. This gives a 3% reduction in heat transfer through the ceiling. On a low wind day, it would be less than 1%

Whirly birds cost $70 plus installation.

If you bought a pack of insulation batts, costing $60, you could cover 5% of the ceiling, giving a 2.5% reduction in heat transfer through the ceiling

So, adding 1 pack of insulation is as effective as a whirly bird and costs about the same. The advantage of the extra insulation is that it works in winter as well!

A solar powered exhaust fan could be more effective, but will be more expensive.

So, invest in roof insulation rather than installing a whirly bird!

The calculation

I assumed the 200 sq metres of roof could be simulated as 200 separate sections of a heat exchanger, each section measuring 1 metre x 1 metre x 1 metre.

The top of the cube was at 70 degrees (the roof temperature on a hot day) and the air entered the first section at 30 degrees. You can calculate the heat transfer by:

Heat = Area x Q x (T2-T1) ,

The internet had Q values varying from 5 to 180 for air - metal interface. I used 5 (the most conservative), although a higher number would seem a better choice. This gives a heat transfer of 200 watts, which would heat the cubic metre of air by .2 degrees each second.

Knowing the volume of air being extracted, you can calculate how long the air remains in the first section and how much it heats. You then pass it to the second of the 200 sections and repeat the calculation in an Excel spreadsheet.

Sounds complicated, but I showed that if the whirly bird extracts 1 cub metre per second, it reduces the air temp 63%. Pretty good!

But a whirly bird has a diameter of 300 mm or an area of .06 sq metres. It extracts air at around .5 metres/sec, which is .03 cub metres/sec. This gives only a 3% drop. A standard exhaust fan extracts around .1 cub metres/sec, giving a 10% drop.

Note: This is the most optimistic value. The heat transfer coefficient is likely to be greater than 5 and the air extracted less than .03 cub metres/sec. Also I assumed air flows evenly through the roof space, which improves the result.