



Solar Energy For Freezing Efficiency

Sounds like something of a contradiction, doesn't it? Light rays from the sun are powering the most efficient refrigeration system we've encountered in the marine industry.

Following the write-up Peter did in **Plate Alloy Boats Of Australia - Book 3** about the deep freeze and refrigeration system built for F&B's project boat *Far-Away*, we've been tracking the results of the program involving the solar panels and this remarkable **Oze Fridges'** system.

For readers who have only recently come onboard F&B magazine, I should explain that when we set out to build *Far-Away*, a production Salty 27 in the cruising version, our inspiration was the challenge of driving right across Australia, towing the boat behind our Ford F250. The idea was to live aboard the boat en-route just like you do in a motor home or caravan - saving a small fortune in exorbitant hotel bills, not to mention cockroach baits, horrible toilets and decrepit motel rooms along the way. It also

meant we could avoid a diet of Mobile Roadhouse toasted sangers or evening meals of deep-fried whatever you can stomach.

Whilst travelling on the major highways can be quite pleasant today, as you get further afield, and the roadhouses further apart, the choices become limited, and with it, so do the eating options.

We've been determined to combat this for a long time, and have been struggling to build a trailerboat we could use as a "motor home" on

or whatever we can squeeze out of our production schedules making F&B and other products.

Keep It Cold

Just about every travelling Mum long ago worked out that the key to preparing fresh, healthy let alone appetising meals along the highway, even if it's just for breakfast and lunch, is a really good refrigerator. Keeping the food chilled, cold or frozen is far more important and a great deal more complex than heating

the towing vehicle's alternator to run the refrigerator on the highway.

This can be quite successful, but the problem quickly emerges that as soon as the towing vehicle has stopped, so has the electric current - and that means you need to either find 240-volt power quickly, or have very large battery capacity to run the system through the night.

As the Waeco/Engel/LG systems all use between 5 and 9 amps, the drain across the night can be horrific - and will commonly flatten batteries by morning. For this reason, most families book into either a motel (with an extension cord plugged into the 240-volt mains power in the room) or sometimes a caravan park, although that is getting harder to do in this age of overflowing caravan parks.

Faced with all these issues, plus the determination that we did not want a genset on *Far-Away*, ("No way in the world!" said PW) we set about investigating the development of a deep freeze and a refrigeration system that we could run purely on solar power.

Far-Away has 3 solar panels on the roof now, for a total of 345 watts. This translates to (345 divided by 12) 28.75 amps - *in theory*.

In practice on the Gold Coast, in what we call our "winter" we found we can get about 7-8 hours a day of 'solid' solar power (with more on the fringes as you head into dawn and dusk) and from that, we can bank on about 70% of what we generate off the solar panels ie $28.75 \times 7 \text{ hours} = 201.25$ per day $\times 70\% = 140.8$ amps going down into the 250amp AGM battery each day.

There is a comprehensive description of this system in PAB-3 so I won't repeat it



the highway, so we could control what we eat, when we eat it and all the basic toilet facilities that one looks for on a day to day basis ie, clean basins, proper functioning toilet bowls, etc!

Obviously enough, these requirements for the highway are replicated the minute the boat is launched and we go out onto the water - we'd like to be self sufficient so that we can go away from the maddening crowd for a week, ten days,

it up as in (say) a BBQ or a grill.

There are dozens of options in the grilling and BBQ department, but as most Mums and Dads have found out over the years, the options in the "chilly bin" department are significantly fewer.

Over the years, most families have made do with Waeco style freezer chests kept in the back of the 4WD, or in some of the more sophisticated set-ups, in the boat itself, using the

here. Suffice to say now, that over the last month since we published PAB-3, I've been tracking the efficiency of the cockpit freezer (100L) and the inside refrigerator (90L) very carefully.

The results are wonderful, and a real credit to the South Aussie engineer Peter Mackay. It was his company, Oze Fridges, that developed this special eutectic refrigeration system.

Bottom line? The solar panels are easily keeping up with the day to day running of both systems.

The freezer is maintaining a steady *minus* 19 degrees centigrade (that's excellent!) whilst the refrigerator in the wheelhouse is sitting perfectly on *plus* 1.7 degrees centigrade. Both are easily adjusted up and down, but these are considered to be the optimum temperatures for long term operation of both units.

This last week, on the Gold Coast, we've had seriously cloudy and rainy



Note the massive wall thickness of insulating foam around the eutectic tank.

weather (more cloud than rain, unfortunately) and it's been fascinating to watch the solar panels' performance during this heavy cloud cover.

The good news is they still kept up with the draw-down of current from the frig and freezer, with the AGM battery dropping down to a low of 149 amps

in the worst case situation (one morning after three days of heavy cloud cover). But with just a few hours of cloudy daylight, the solar panels zapped in more than enough to bring the battery right back up to 243amps from a possible maximum of 250.

When the sun is out on a normal sunny Qld day, by

lunchtime, we've topped the battery right up again.

This is simply fantastic news. We're not even using the Hondas' big alternator capacity to top up the battery - it's all being put in by the sun. It's free, it's totally silent, and as close as we're going to get to a perpetual energy cycle in a marine environment. Better still, it works on the highway too.

Goodbye servo's and Roadhouses, hello fresh salads - crisp lettuce leaves, firm tomatoes and tasty cold ham or chicken with chunky fresh bread. Has to be a very big step forward, don't you think?

F&B

***After a 20 year career in ships chandlery, leading up to the position of GM with Whitworths and BIAS, Ruth became SEA Media's publisher in 1993, and has directed traffic at F&B ever since. Today, she also maintains a very deep involvement in boat building F&B's project craft, and is the skipper of "Whim-Away", F&B's camera boat, and "Far-Away", the long range expedition cruiser. Very few people have her depth of knowledge concerning boat fit-out and chandlery.*