Low Footprint Cata

UPDATE

To me the principal hurdle before embarking on this project was how best to dispose of sewage in the least noxious and most environmentally friendly manner. Chris Palmer, environmental engineer and founder of Envirotech treatment systems, was the first person to inform me about the viability of a composting toilet for a boat, but I was rather sceptical at first. Further research however validated his assertions. I continued to annoy Chris and Stephanie, his daughter, an environmentally conscious business graduate, with my ideas for several years. When the opportunity to put this project together finally came about, it proved impossible for me to move aboard initially due to shore based commitments, hence Stef very kindly agreed to take on the practical aspects of initiating this project and to boatsit for a few months.

The key concept is lifestyle modification without significant lifestyle compromise. Indeed, many aspects of this project are positively beneficial, such as the exercise of kayaking to and from the boat. Carrying water to the boat is also good exercise, forces us not to take fresh water for granted and focuses our efforts on water conservation. Stef outlines her experiences below. Ultimate proof of drastic energy reduction will require a formal energy audit which I hope to arrange in due course. This will also prove that a low footprint, low energy lifestyle is a huge money saver and hence economically eminently sensible in the long term. – GEOFF CHIA

maran Project

Geoff, Stef and Chris promoting the Low Footprint Project.

AN INDEPENDENT LIVEABOARD REPORT BY STEF PALMER

We are facing a mounting number of global challenges: resource depletion (especially petroleum), climate change, ecosystem damage and over population. These problems are largely attributable to our overconsumption and wasteful habits. By various reckonings we would require the resources of between four to eight planet earths should the developing countries achieve our current rate of overconsumption. Such an outcome is clearly impossible. Hence as a result, enforced energy descent looms before us as an increasing threat to the world economy and to world peace. The concept of voluntary contraction and convergence has been mooted as an equitable means of distributing the earth's increasingly scarce resources. But how do we convince the rich world to make do with less? One way is to demonstrate the viability of pursuing a low footprint lifestyle without compromising quality of life.

I embarked on the adventure of living aboard Geoff Chia's Mahe 36 to help test and refine the boat's systems. The past few months have been a crash course in sustainable technology and the logistics of living aboard. I share with you my observations and experiences of life on board a catamaran in the hope that these experiences may inspire others to strive for a comfortable low consumption lifestyle.

ELECTRICITY AND APPLIANCES

Generating, storing and inverting sufficient power has been the most significant challenge to demonstrating the possibility of a low carbon, high amenity lifestyle. The objective is to power a full suite of mod-cons onboard with the boat's solar array. We managed to power all DC systems (eg the water pump, ultra efficient fridge, low current LED lighting) primarily on solar power. The washing machine, rechargeable vacuum cleaner and Mac laptop, however, require the use of the high power inverter and thus draw significantly from the batteries. There were a number of situations where I had to run the diesel engines to keep the house batteries sufficiently charged. A few consecutive cloudy days and the slightest glitch such as leaving on the inverter, a water tap (and pump) running continuously (a beginner's mistake never to be repeated) or even falling asleep with a few LED lights on and the batteries were soon depleted. The main issue was that of appliances which require AC input and the high power inverter. Using low voltage DC to DC adapters where possible and a lower power inverter to reduce energy losses has made a huge difference.

I have become rather strategic about timing my use of energy and switched from my colossal MacBook to a small notebook computer (which still has full multimedia functionality including digital HDTV). Spacing out laundry loads and

charging appliances while there is ample direct sunlight is available have been simple yet effective measures to keep the house batteries topped up. It was thus possible to go on for weeks without needing supplementary charging, so long as the days were sunny.

Additional solar power and storage is still on the drawing board, to ensure sufficient energy is available without the need to run the engine after a couple of cloudy days.

SOLAR HOT WATER SYSTEM

This proved a little disappointing. Whereas effective on sunny days, the temperature was not anywhere as hot as a commercial domestic hotwater system and was supplemented by stove heated water on cold overcast days. Geoffrey will be looking into improving efficiency with added insulation.

FRESHWATER

Living aboard for a few months certainly demonstrates the value of water! Despite unseasonal rainfall earlier this year, it was not possible to harvest and store enough rainwater. It is intended that the boat will be fitted with a watermaker when the boat's energy storage and solar generation capacity has been further boosted. In the interim, able bodied visitors were at times recruited to help haul jerry cans of tap water to the vessel, just a short distance rowing from pontoon to boat. Fresh water is reserved for drinking, bathing and laundry while grey water (from washing machine rinse water) is harvested for the initial scrubbing of dishes and the decks. Not a drop is wasted, from the three litre shower technique to my dishwashing method.

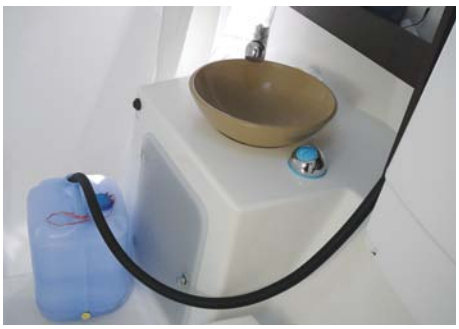
My daily rituals have been honed for conservation and the boat's many guests have been surprised to learn just how easy it can be to conserve freshwater with a bit of forethought. The only unfortunate thing about being moored in the Brisbane River is that the polluted brackish water is really only be usable for the lowly tasks of scrubbing growth off the hull of the dinghy tender and flushing the marine toilet (which is used soley as a urinal).

WASTE

The most common onboard sewage option is to have the boat fitted with a holding tank which is periodically pumped out. Alternatively, present legislation allows the discharge of class 'C' waste: sewage is macerated and chlorinated then expelled into the river. Neither of these options satisfied our sustainable criteria and so a compost unit was sourced. I must confess this was my greatest concern about living on board. I had a terrible fear the toilet would emit an unbearable stench or worse still, leak!

Something we didn't initially consider was bug proofing the ventilation intake. Soon after the compost toilet was in operation, tiny fruit flies started to appear. Not a pleasant situation. It was however easily solved with a decent dose of (not-so-sustainable) bug spray and ultimately by applying a gauze screen over the air intake vent.

Ten weeks onboard and I am now onto my second batch of compost and the system is most satisfactory. Dear reader, allow me to reassure you there is nothing to fear. A peat moss brick is used to



All halogen bulbs (10W each) have been replaced by warm white LEDs (approx 2.5W each) with equivalent light output (inset from left to right: tower LED, disc LED, halogen bulb). (top left)

Stef activates peat moss for the composting toilet. (top right)

Insects previously entered the solids bin via the air intake vent. (centre left)

Mesh secured over air intake vent. (centre right)

After the wash water has been discharged, the drain outlet of the washing machine is connected to ... (left)

... a hose filling a jerry can to harvest the rinse water for grey water purposes. (above)

Final setup of composting toilet.

establish a high carbon to nitrogen ratio and to provide the microbial colony which undertakes the humble job of turning solid waste into benign soil. Wood shavings and nutshells were added to keep the compost aerated and dry. We learned that sawdust absorbs moisture and causes the compost to clump and hence is unsuitable. Coarse wood shavings (not pinewood however, which has an antimicrobial effect) are suitable to keep the mix aerated and the compost should be churned at least twice a day to keep suitably aerated. The odour, as stated in the marketing literature, is merely an earthy, mossy, not unpleasant smell, only detectable when the lid is up.

FOOD STORAGE AND PREPARATION

Both stove and oven are LPG powered. Despite being a keen dinner party hostess, I managed to make a single 3.7kg LPG canister last seven weeks and this second canister is set to last even longer as I have been experimenting with raw foods. Even surplus boiled water is kept warm in a thermos to save re-heating energy. Eating less meat and using powdered milk also meant that the freezer and fridge, although fully functional, were hardly needed. Furthermore, a vegetable based diet reduces the energy embedded in foodstuffs.

TENDER/COMMUTE

I am fortunate to live, work and shop within a two kilometre radius. Almost everything I need is in walking distance and thus commuting to land is relatively straightforward with a kayak for solo trips and in an inflatable dinghy for carting

Solar hot water panels on port side of coachroof. (top left)
Port half of the rear solar PV panels. (top centre)
This floating house is also an ocean going sailboat! (top right)
Solar PV panels form a shady eave over the rear of the bimini top. (left)

guests, groceries and water aboard. With a little adjustment I manage to make it to work every day in my suit without a drop of fossil fuel.

CONCLUSION

Many of us have ideas of living sustainably but few of us land dwellers have the knowledge, resources and determination to obtain and implement the necessary systems. With a well planned setup, a few pearls of wisdom from my dear neighbours afloat and Geoffrey's determination to refine and improve the boathouse, his Mahe has become a comfortable low footprint dwelling.