

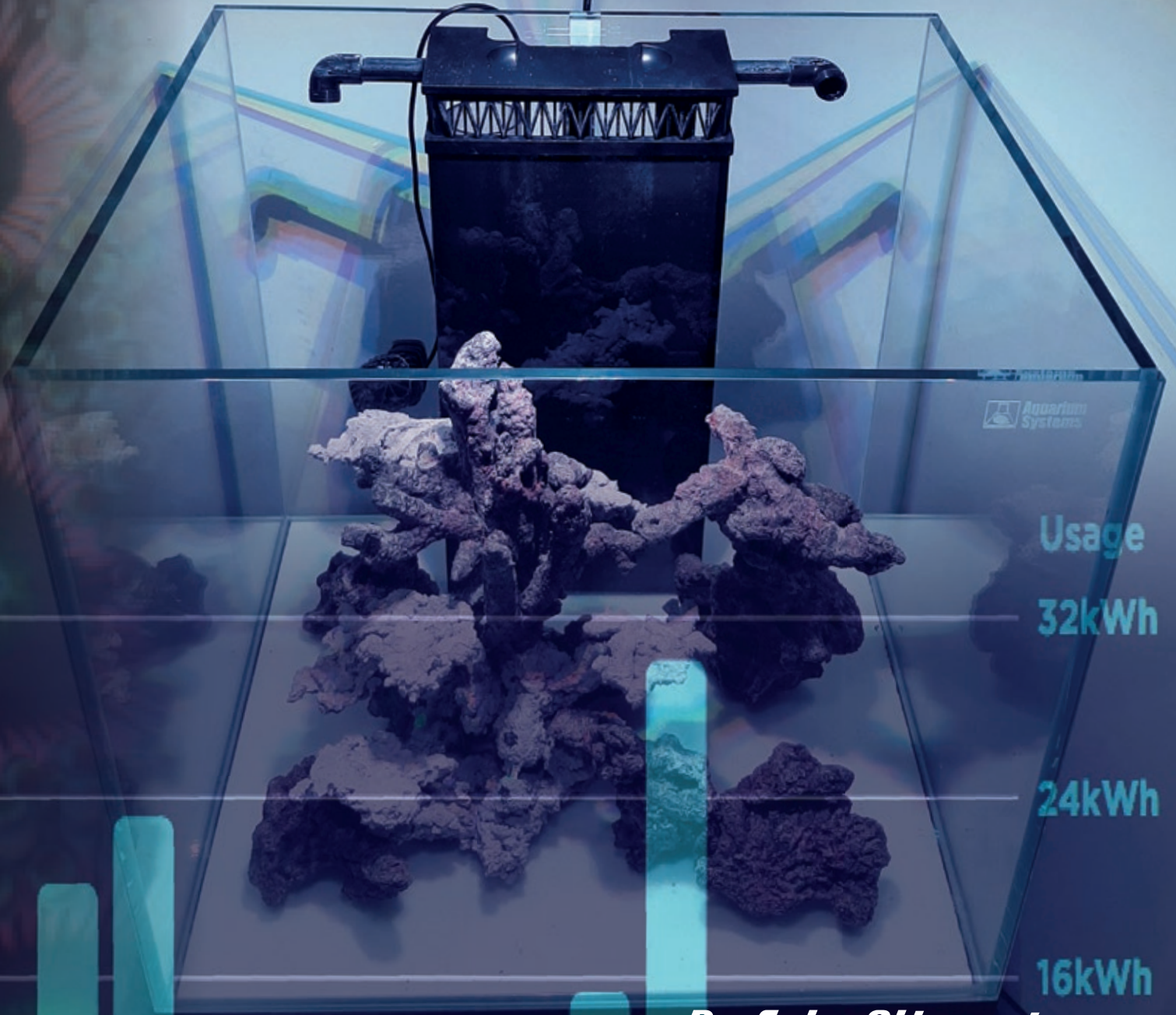
LOW ENERGY REEF

PART 1



An award-winning photographer and lifelong aquarist, John has worked with numerous top marine retailers, publishers and manufacturers on a freelance basis over the last 20 years. He has also collaborated on a range of projects with experts in the field, and supported organisations such as zoos, public aquaria, conservation initiatives and educational establishments. He has been Editor of UltraMarine since October 2015. Read more about John at: ultramarinemagazine.co.uk/contributors/

10th Jan



By John Clipperton

It's been around 18 months since I closed down my most recent tank (a 5x2x2' Red Sea Reefer 625XXL) and I have to say, my office has felt rather drab especially over recent winter months. I took the decision to close down that tank as it had reached the 5 year mark, and although it was looking nicely grown-in, I was having one or two minor but irritating issues with it.

19th Jan



My last tank was around 5 years old and was getting pretty full when I decided to strip it down for a change.

I have always wanted an in-wall tank in this location actually, and part of my reasoning for dismantling the 625 was that it opened up the possibility of moving forward with that project. To be honest, I had always only really intended to run this system for a few years until I could forge ahead with the in-wall build. Unfortunately, in the interim period before I moved forward with the project, energy prices started to rise first slowly, then drastically with the invasion of Ukraine. We also had a new kitchen fitted around this time, and my office ended up being used as a temporary kitchen and dumping ground for a few weeks.

While the energy price storm doesn't seem to have abated yet, recent months found me thinking more and more about an Aquarium Systems L'Aquarium 2.0 that I also had sitting idle. I reviewed this tank back in issue 80 and really liked it. Although it's been empty, I felt loathe to pass it on. It's around 240litres total volume, has got a metal framed stand



The L'Aquarium just after I set it up back for a review in issue 80. I really like this tank and felt it deserved another effort!



and I found it ran well. I did experiment with some NPS corals in that tank but didn't have too much success. I found that I just couldn't source the quality or diversity of livestock I wanted, or dedicate the time to running both this system and the 625. As such I had stripped down this system as well many months ago (all livestock had been traded back to local stores for credit incidentally).

With my plans for the in-wall build still on hold until energy prices come down significantly (if they ever do that is!) I decided that it was time to take the plunge with this little tank, but decided I'd do something a bit different this time. I've set-up several home reef systems over the years and have done mixed reefs, SPS tanks, NPS and species tanks, but I've never done a dedicated LPS or Zoa system. Given their somewhat lower demands in terms of lighting and flow, I thought this would also fit with a desire to experiment with a low energy input system to help keep those bills down. Through this series therefore, I hope to not only document the set-up of a reasonably modern looking and visually stunning mini-reef, but also to share my findings related to cost efficiencies. As a result, I hope this helps not just those considering setting up a new system but also folks looking to maximise the efficiency of an existing one.



After giving the tank a good clean, I started making a few modifications. I removed the black vinyl backing from the tank, and scraped the foam off the bottom of the sump (a paint scraper proved better than the knife shown)

So, as mentioned I am using an Aquarium Systems L'Aquarium 2.0. My preparation started with thoroughly cleaning the system in my back garden and choosing a suitable location. for it to be permanently placed. I ended up locating it in my office roughly where the 625 had been, but angled into a corner. This area is away from any doors, draughts, possible heavy foot traffic, and the floor is level and solid. There's also suitable electrical infrastructure.

Although this system is eminently fit for purpose as standard, I decided to make a few modifications. First, I lined the black cabinet with white polystyrene sheeting from B&Q to give a super-clean look and to allow me to see what's going on in the sump more easily. I suppose this does also confer some sound and thermal insulation also. I also added a battery powered, motion activated light to illuminate the entire sump space from the underside of the tank. While I would have preferred a glossy vinyl type product for the cladding, using the polystyrene worked out to be far cheaper, only costing around £15 for easily more than I needed (which allowed for a few inevitable mistakes when installing). I did have to scrape the standard dark grey foam cushioning off the bottom of the sump which proved somewhat arduous, but a glass paint scraper really helped here. The polystyrene sheet that I purchased is essentially the same thickness and density of the foam I removed, so I'm sure it will cushion the sump safely. The polystyrene is also waterproof of course, and easily removable/replaceable if necessary. Rather than a glossy finish, it has a rather sparkly appearance which I like. It was also very easy to cut to shape and I therefore filled in the panels inside, rather than cladding it "wall to wall", leaving the metal supports of the stand visible. When the door is open, this gives the cabinet an almost floating effect when viewed against the white wall behind the tank. Finally, I removed the grey foam from the top surface of the stand too, and replaced this with a sheet of white polystyrene. This should mean that if run bare-bottom, the floor of the tank will be white, rather than see-through and dark (as it is in standard form). I was chatting about this with Rory at ReefKeeper Rugby and

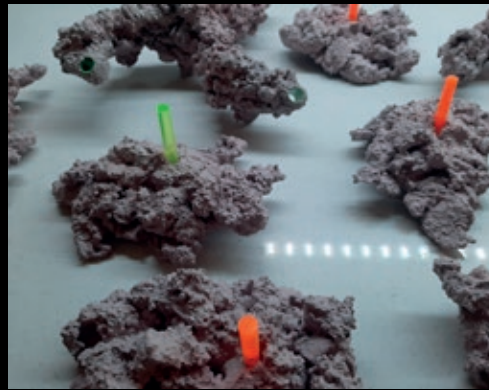
he said I was a brave man to try this. I have to say that I suspect the maintenance required to keep the tank looking as spotless as I am envisaging, may prove a little too much. In that case I may just add sand as doing so may well allow the inclusion of certain other reef organisms anyway. Whatever the case, I am including some Maxspect biospheres and blocks in the sump to give a little extra denitrification capacity. Going back to DIY matters, I also decided to remove the black vinyl from the rear of the tank as again, I wanted to try a different look with this tank. I hope that the rockwork structure I have in mind, once festooned with fleshy LPS corals, will eventually obscure the central weir. On this, removing the backing also meant I could see into the weir from the back of the tank which could prove useful, even if to do so would mean sticking a mobile phone on a selfie stick behind the tank and videoing it. In terms of placement, I decided to angle the tank in a corner as I had space and this allowed easy access to all sides and the rear for cleaning the glass.



The original inner of the L'Aquarium is dark grey/black so cladding it with white polystyrene really brightened it up. The main chamber will contain a roll filter. The wiring behind the tank isn't so neat, I did try though!



Energy monitoring is key to this project so I sourced a couple of Tapo P110s which seem to get reasonable reviews and only cost £10 each



i was lucky enough to be provided with some artreefrock by Nick at BCUK... I'll be reviewing this on the UM website in the next few weeks. I did add a few bits of TMC EcoRock to fill out the scape a little (bottom image)

Electrics was another area that I considered carefully. In it's previous form, I had installed two 6 gang plug bars in the cabinet in this system and although this was neat and worked well, I wanted to completely de-clutter the cabinet this time. Given this, I located the plug bars to rear of the tank this time, keeping them well away from any spray or salt creep. Similarly, any power bricks are attached to the rear of the cabinet with heavy duty Velcro. In terms of organisation, I made a list of which plug went where on my phone's notepad app, rather than labelling plugs. I did consider using "smart" plug racks to allow for app or Alexa control but frankly, I just couldn't see a need for this. In my experience, network issues can sometimes cause a headache with such devices thus negating any benefits of using them. With energy monitoring a key part of this project, each plug bar was plugged in at the wall socket with a Tapo P110 energy monitor. These only cost around £10 each but still seemed to get reasonable reviews online. It remains to be seen how their readings compare to the claimed consumption of various items of equipment. Whatever the case, these should allow for individual devices to be assessed even if it means swapping plugs around occasionally.

With modifications complete, electrics in place and the stand carefully levelled, I assessed the equipment I'd be starting with. This is shown in the table on the next page which also shows the manufacturers claimed energy consumption for each item, plus notes and estimated individual costs for daily, weekly, monthly and yearly operation. The figures attained in this configuration seem reasonably affordable to me even if energy prices were to rise, and I do

Item	Power Consumption (watts) (based on manufacturers figures)	Notes	Estimated Cost over 24hrs
1x Reef Flare Pro Blue (S model)	Full power - 65w	I plan to run this light at around 75% power (or approx. 50 watts) for 8 hours a day, certainly in the early stages of the tank's development. Daily, I plan to ramp up slowly over the course of 3 hours each side of main photoperiod giving a total photo period of 14 hours.	20p
1x Sicce SDC 6.0 return pump (2000 - 5500lph)	10 - 40w	This will be run 24 hours a day at a medium power level, giving an estimate flow rate of approx. 3000lph at 25 watts (this means the turnover through the sump is just over 10x per hr)	20p
1 x Titanium heater	200w	Estimated "ON" for 4 hours per day in total. Unit is controlled by D-D Temperature Controller which is on for 24hrs and consumes <3 watts (cost of 2p per 24hrs). Cost may change depending on season.	32p
1x Sicce XStream SDC	12w	Likely to be run at 50% power overall	5p
Roll filter	<2w	negligible	negligible
Reactor	10w	low wattage but runs 24hrs... but may not be used constantly	max 8p
RO unit	15w	est. 10 hours per week at cost of 6p, so negligible daily cost	negligible
Dosing pump	<2w	sporadic, brief consumption, so negligible cost	negligible
Room extractor fan	15w	5 hours (operates on a timer)	3p
TOTAL DAILY / WEEKLY / MONTHLY / YEARLY COST (assuming electricity cost of 34p / kWh)		90p / £6.30 / £27.90 / £328.50 approximate costs	

believe there is a little flexibility to reduce the amount by 5-10% if really necessary.

It's worth remembering here that of course electricity bills are only part of the running costs of a reef tank though. Water costs, salt mix, foods, supplements, additives etc all add to the cost. I will cover some of these as the series progresses, but the main focus of this article is really energy consumption for now. If you do wish to look at the "big picture" in more detail I highly recommend reading the article that Campbell Robertson produced back in issue 91, entitled "Reef Economics". There are definitely some great tips in that piece, some of which I will be using myself on this system (I've put it on the UltraMarine website actually).

One significant area that should be considered though is mixing of new water. I am planning to use the mixing station from my 625 for this tank, which consisted of a large lidded plastic tub fitted with a float valve (linked to my RO unit), plus a heater, mixing pump and supply pump. Clearly this will add to the energy costs of the system even if perhaps it isn't being used frequently. It's definitely something I haven't forgotten though.

Going back to my equipment list, I suppose the most interesting thing is the choice of running roll filter instead of a skimmer, indeed I was reading a poll on this subject on UltimateReef at the time of planning this system. Given that there were a number of people claiming to be able to run a

system on a roll filter alone in this thread, I thought I'd give it a try myself especially as, if it didn't prove as effective as a skimmer, the proposed stock in this system should appreciate a small amount of organics anyway. I was also lucky enough to be asked to trial one of the new Reef Factory S-sized Smart Rollers filters which are due imminently (and possibly commercially available by the time this article is published). While I think I could have squeezed in a roll filter from one of the other major providers the Reef Factory unit seems much more suitable for this size system. I must add that I do have a couple of skimmers available if needed too with my most likely option being an UltraReef "Borei" filter which I've run on this tank previously. At this stage I am excited to try

the roll filter though as it should use way less electricity than a skimmer, be much quieter and not be prone to overflowing. I don't think I'll miss emptying a skimmer cup either! As I don't actually have the roll filter at the time of writing this article though, I haven't decided exactly how to plumb it into the system. I have to admit that while I've never had any issues with the valve controlling the overflow on the L'Aquarium, I am considering changing the pipework to include a gate valve... and yes I'm also close to succumbing to the trend of incorporating fancy coloured pipework too. This is all material that I will cover in the next installment anyway, by which time I have to have filled the tank and be at the cycling stage. One other point of note in the equipment list is that

there's no ATO listed as I am starting the system using the built in top up reservoir that comes with the L'Aquarium. While this works perfectly in my experience I do plan to remove it down the line and connect up a much larger remote reservoir which I will also be using as a mixing station. Linked in with this system, I am going to be using a pumped RO unit from Finest Filters so obviously that has an energy cost (as shown in the table). Finally, I'm aiming to repair the wall mounted extractor fan that I have in this room. This stopped

working several months ago but I'm hoping to use it on a timer to stop any condensation build up in the room. I haven't actually included any cooling devices into the list yet as in my experience this room stays quite cool even during the warmest summers. It's something I can easily add though and I may well do this soon.

I was fortunate to also be sent some "Artreefrocks" for trial purposes. I'm going to publish an online review of this artificial reef rock on the UM website in the coming weeks

but my initial impressions are good. It took a few minutes to work out how to assemble the structure as the instructions weren't overly detailed, but it wasn't too tricky in the end. My immediate thoughts were that the structure was a little on the small side for this size tank, but I've decided to keep it in as I've made the mistake of using too much rock in a couple of the tanks I've setup over the years. The lack of water in the tank at the time of assessing it could also play a part here certainly thing it may take a while for this tank to look grown in though

especially as I am planning to add small frags or colonies. I have added a few small pieces of TMC EcoRock just to expand the scape a little but nothing is too intricately stacked, so pieces should be very easy to remove if necessary.

So that's where I am up to at the moment. Next issue I will be filling the tank with water, engaging systems and cycling the tank. At this point I will hopefully have some real world data to share relating to the energy consumption and costs of the system.



Left: the tank is still empty at the moment but most of the key systems are in place. I decided to hang the ReefFlare in the end as the bracket wouldn't fit onto the back of the weir easily. Right: I'm just waiting for the roll filter to arrive now and will then do a test fill. I've kept the sound insulation on the inside of the door from the tanks previous incarnation as it really cut the noise down.