

## COOL YOUR HOME WITH THE SUN - MICROSOLAR COOLERS

Is your house too warm? Roof too hot? Air cond bills too high? Want to cool your building without air conditioning or want to reduce air conditioning bills? Want more fresh cool air ventilation? Do you need hot water showers without electricity heaters? Microsolar has a range of low cost high efficiency solar coolers and solar water heaters that will fit your homes requirements, saving you money without breaking the bank, and reducing your carbon footprint at the same time. Upgrade your home for a relaxed quality of family life, be cooler and more comfortable, with more fresh air ventilation and less humidity. Works 24/7 essentially without electricity. Bringing the latest technology at affordable cost. Estimated Return On Investment ROI based upon actual Customer electricity savings 2 years for coolers (see below).

20220415 pictures show installing Microsolar Cooler at Bandar Utama Petaling Jaya Malaysia and Sierramas Resort Sungai Buloh

20211102 pictures show installing 2 units of high efficiency Microsolar Water Heaters M60VTHE and one unit of low cost high efficiency Microsolar Cooler at a hilltop bungalow at Kenny Hills Bukit Tunku, Kuala Lumpur, Malaysia. Lat 03 N

Sample of Customer "Y" in an afternoon sun facing (west) single storey house, with uninsulated roof tiles and concrete roof slab, her reasons for requesting Microsolar Cooler installation "I'm looking for something that can cool down the house. The air cond man mentioned my house air is hot that's why the air cond is not effective."

Customer "Y" 10 days after Microsolar Cooler installation Aug 2022, when asked whether it was cool enough in the mornings in the house (Before Cooler installation, Customer had complained it had been warm and stuffy in the mornings and always too warm in the kitchen): "...I see some improvement by letting the fans running overnight. Only in the morning yes, the kitchen too I can feel, ...anyhow I can feel cool air (coming) down when fan is on. The one vent room can feel difference now, the air flow is cooler..." (the last bedroom ceiling had only a small part ceiling attic space, the main ceiling and that of the kitchen were mainly covered by an uninsulated concrete roof slab, very hot in afternoons.) So we were able to install only one ceiling vent in the last bedroom and none in the kitchen, had to rely on the Microsolar Cooler cool air indirect overspill from the dining room instead. The dining room and lounge and 2 middle bedrooms (no windows) all had direct ceiling vents to the ceiling attic space where the Cooler was. Despite the hot concrete slab roof and hot uninsulated tile roof, overall results for the whole single storey house were still much cooler than before Microsolar Cooler installation.)

Customer "Y" 10 days after Cooler installation: "So far I start to feel my kitchen is not so hot as before. So far rooms are ok, I have fan running almost 24 hours. In fact the living and dining with fan on, the morning is a bit chill. Especially the living room, only get warm in the afternoon when the sun is hot." (Compared to the situation before, when the whole house was so hot the air cond had to be switched on much of the time, the living room which was facing afternoon sun was hot and stuffy all the time, and the air cond technician had said her house air is hot that's why the air cond is not effective. Now, its much cooler, the air cond hardly needs to be switched on.)

### MORE CUSTOMER FEEDBACK

And actual customer feedback during a hot weather spell Oct 2021 of a Microsolar Cooler user in intermediate terrace house in Bandar Utama Petaling Jaya, Selangor, Malaysia, to the question "How are the Microsolar Coolers doing so far? How much of a reduction in aircond bills compared to before Microsolar Cooler installation? How are the Microsolar Coolers holding up with the warm weather?"

Customer "K" Oct 2021: "Not bad at all. Hard to do a comparison because of the varied weather but the house is a bit more comfortable now. I still use air cond on hotter days but there's a marked difference in the temperature outside compared to inside (with Microsolar Cooler only, without air cond)"

Customer "K" March 2022 when asked about electrical savings: "... did not save much because I added other electrical (appliances) but I regained use of my upstairs...before this I'd just not sit upstairs in the afternoon. Nowadays it's cool enough, maybe about 2 degrees C cooler upstairs than before."

Another customer "F" also in an intermediate 2 storey terrace house in Kuala Lumpur, Malaysia, installed a single unit of Microsolar Cooler to the Master Bedroom in Feb 2021, his feedback:

Customer "F": "...Just to clarify. The bedroom is now quite cool..." (The wife was using the master bedroom upstairs as her office during the Movement Control Order but the air cond bills were high, so with that good result of not having to use aircond in master bedroom unlike before, they requested another unit of Microsolar Cooler to the childrens bedroom and to the downstairs lounge where the husband had his office. )

Customer "F": "Hi Ms A...., the product works well and I'm genuinely interested. Would you kindly consider increasing the discount considering that this is my third major transaction with Microsolar? I've been a loyal customer and a proud campaigner for Microsolar." (Customer "F" had been using his Microsolar Water Heater happily for the last 21 years without problems, and had recommended Microsolar to many friends.)

The second Cooler unit was installed in March 2021 before Hari Raya Aidl Fitri festival)

April 2021 Microsolar inquired of the customer "F": "...How is the ground floor lounge temperature now...can the cool air reach there?"

Customer "F": "Yes. Especially when the fan is on as it sucks cold air from above."

Customer "F" added on May 2021: "Cool home makes a nice celebration."

Another Customer "T" in June 2022 "Thanks, we now sleep without air cond. Feel cooler..."

Customer "O": Hi, my house is much cooler at night. I don't need the Aircon to sleep, just the fan. It is cooler at night."

For these happy customers, air cond use is greatly reduced to only on very hot afternoons only compared to before (when the air cond had to be switched on for whole house upstairs and downstairs most of the days and nights). But now, the air cond has to be switched for much less hours and sometimes not switched on at all.. Even if the aircond is switched on, its compressor load is much less now compared to before. For instance assume on a hot afternoon the outside temperature is 33c whilst the required indoor target temperature is 23c, the air cond has to work hard to overcome a temperature difference of 10c. But with Microsolar Coolers installed, the indoor temperature might drop to 28c naturally. If the air cond then has to be switched on it only has to overcome a temperature difference of 5c (instead of 10c) to reach target temperature of 23c. Thus a 50% reduction in aircond bills is achieved.. And the air cond, even any old air cond, will seem doubly cool when switched on compared to before. And this leads to much more efficient air cond compressor running, less maintenance issues with the air cond system.

And also if the customer is happy with 27c/28c/29c on many mornings/afternoons (and 25c/26c/27c at nights) with the naturally reduced humidity, then the air cond may not need to be switched on at all on those days..resulting in a 100% saving on air cond bills on some days..

Generally, on hot afternoons at 1530hrs, the Microsolar Cooler cools the indoors by 4c to 6c, sometimes 7c, from the outside ambient temperature, essentially without electricity (a small 10cm diameter USB fan may be used to circulate air 24/7, running cost RM25.00 (USD6.00) per month. .

EQUIVALENT 625 WATT (0.84 HP ) AIR COND RUNNING 24/7 (ESTIMATED ON ELECTRICITY SAVINGS MEASURED BY CUSTOMER)

Another customer “W” 2022 March reported after 6 months usage, for a 3 storey intermediate terrace house 2800sft Kuala Lumpur 5 pax family (been diligently monitoring air cond use before and after installation of one unit Microsolar Cooler,) regarding air cond savings: “ ..it’s 25% to 30% reduction amounting to RM200 to RM250 monthly savings (400 kwh to 500 kwh electricity savings monthly, i.e. equivalent to a 625 watt/0.84hp ac running non stop 24/7)

ROI (RETURN ON INVESTMENT) 2 YEARS (ESTIMATED ON ELECTRICITY SAVINGS MEASURED BY CUSTOMER)

Note that electricity savings in this case translates into RM2,400 to RM3,000 annual electricity savings, which gives a Return of Investment ROI of 2 years approximately. (Different families in different houses, may vary in the amount of savings attained).

Microsolar was one of 4 worldwide Awardees of TIME MAGAZINE’S “HEROES OF THE PLANET” AWARD 1999 (05 April Asia)

Microsolar Water Heaters and Microsolar Coolers had been awarded the following Patents under TEOH Siang Teik (not all are listed):

US 6,014,968, US 9,739,493, US 9,739,495, US 9,890,964B2, US 10,486,465

AU 711669, AU 2015202537B2, AU 2016203886B2, AU 2017261629B2, AU 2017272291B2, AU 2019100733

EP 0852689B1 , IDP 000060487, IDP 000066011, MY 113401-A, MY 174077-A

CONTACT US:

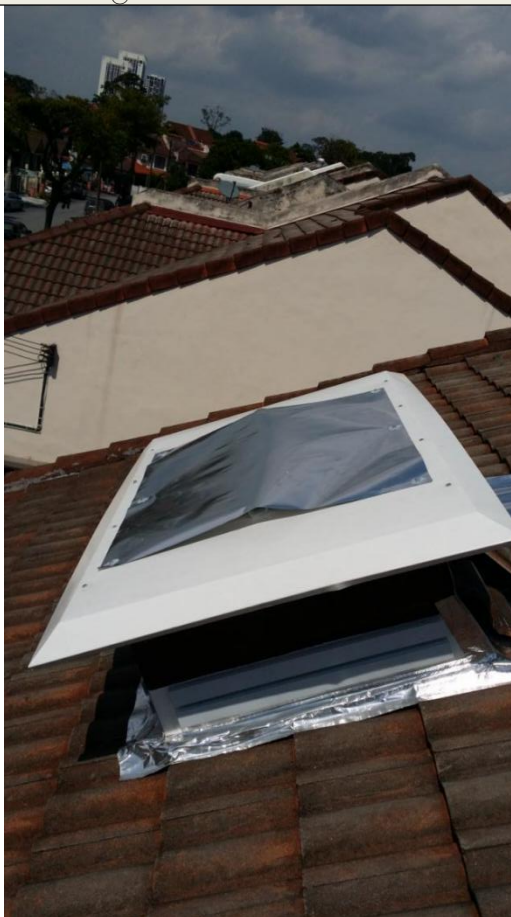
[www.microsolarsystem.com](http://www.microsolarsystem.com)

Facebook "Microsolar System Water Heaters"

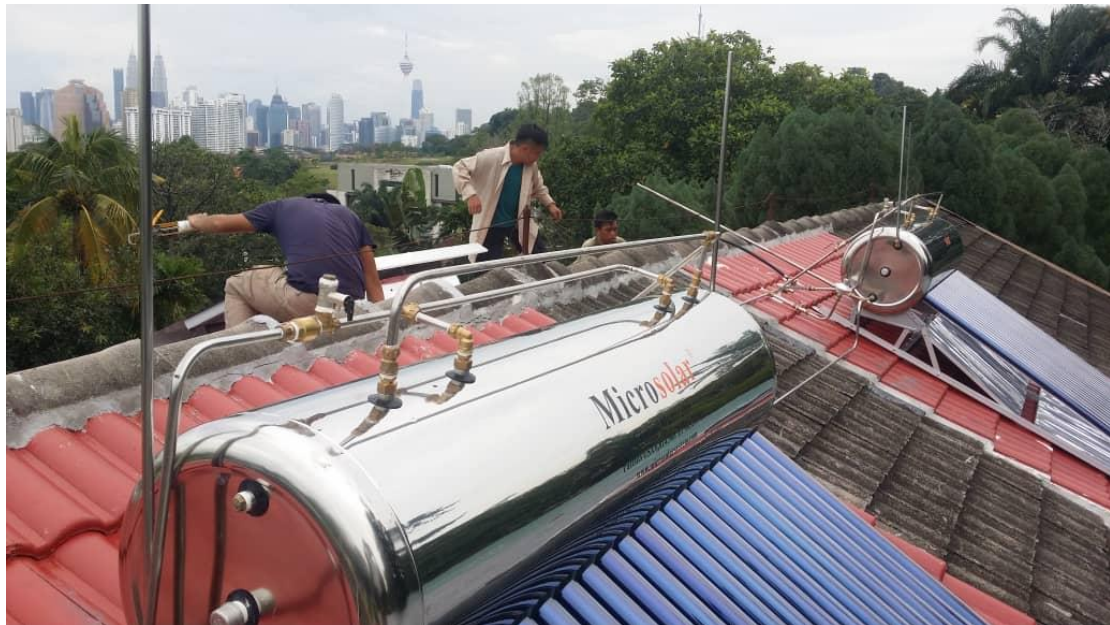
mobile +(6013) 3625965 +(6012)3325965

email: [microsolar@hotmail.com](mailto:microsolar@hotmail.com)

Tropicana Indah  
Petaling Jaya  
Selangor  
Malaysia  
Aug 2022  
Microsolar Cooler



Bandar Utama  
Petaling Jaya  
Malaysia  
April 2022  
Microsolar Cooler



Kenny Hills Bukit Tunku Kuala Lumpur Malaysia Nov 2021, 2 units Microsolar Heaters and 1 unit Microsolar Cooler





Bandar Utama Petaling Jaya Malaysia April 2022

(lower pic above shows Microsolar Cooler on the ground before hoisting onto roof)

#### BACKGROUND TO MICROSOLAR COOLERS

Microsolar produces high performance low cost solar heaters and coolers, (probably the most efficient on the market) . We design and manufacture our products with careful attention to unequalled performance and high quality, from drawing board until rooftop installation. Our patented Microsolar Coaxial Multivavle heaters have been tested by national authorities such as SRCC of USA and SABS of South Africa see [www.microsolarsystem.com](http://www.microsolarsystem.com)) among others and even after 15 years, there are simply no competitors that approach our efficiency levels. The Microsolar Heater since its inception in 1981 in Nepal is still the most efficient thermosyphon solar heater on the planet. As for our unique patented Microsolar Coolers, there are no other equivalent solar coolers on the market, working essentially without electricity, and delivering cooling 24/7 (up to 5c/10f below ambient temperatures during the hottest parts of the day), with such a small rooftop footprint 1200mm x 900mm and

for less than USD1000.00 installed in Kuala Lumpur Malaysia. With Return on Investment 2 years as measured by a happy customer (an accountant by profession) .

#### WORLD LEADER IN THERMOSYPHON SOLAR TECHNOLOGY

From the early initial development in the high Himalaya in the remote inaccessible valleys of Zaskar and Ladakh India for Tibetan refugees to the Gorkha District and UNDP Headquarters Complex in Kathmandu Nepal 1982 , to solar central heating of farmhouses in Pennsylvania USA and Cornwall UK in 2008s, to mining workers quarters in South Africa in 2010s, Resort Hotels in Hilton Head Island SC USA and Manado North Sulawesi Indonesia, to University Campuses and Hospitals in Sarawak Malaysia until today's worldwide market in 2022, Microsolar is focussed in bringing you the leading technology in solar heating and cooling at affordable prices. (see [www.microsolarsystem.com](http://www.microsolarsystem.com))

The customer is our inspiration, the experience gained from being on the leading edge in solving each client building's unique heating and cooling problems essentially without electricity supply, in extreme climates, with a myriad variety of environments over the last 30 years trickles down to improved product performance installed on your roof.

For further information on Microsolar Coolers and Microsolar Heaters please see Facebook "Microsolar System Water Heaters" and [www.microsolarsystem.com](http://www.microsolarsystem.com)  
Email [microsolar@hotmail.com](mailto:microsolar@hotmail.com)  
+(6013) 3625965 +(6012)3325965



Architect Teoh Siang Teik with the first Sunworks Nepal/Microsolar Multivavle Solar Heater on roof of his office, Hitti Durbar Kathmandu Nepal 1982. Historically the very first high efficiency thermosyphon solar heater where the solar heating tubes are directly connected to the solar tank, without bottlenecks in thermosyphon flow.

**EARLY HISTORY OF MICROSOLAR WATER HEATERS  
DESIGNED BY MR. TEOH SIANG TEIK 1981-1999**

**Architect Mr. Teoh Siang Teik supervising the installation of Microsolar water heaters at the United Nations Headquarters Complex,  
Pulchowk, Kathmandu, September 1987**







Siang & Mr. Narayan Prasad Shrestha in front of their factory at Tekushi, Kathmandu. Sept. 1987

## NEPAL sept 1987

UNITED NATIONS HEADQUARTERS  
COMPLEX, PULCHOWK, KATHMANDU

solar panels visible here  
but several changes have been



THE RISING NEPAL  
SEPTEMBER 7, 1987 MONDAY, 3



### SOLAR WATER HEATER

- \* Available in various capacity & models.
- \* Orders booked upto end of Ashwin '044.
- \* 5 to 12 % discount for advance booking.
- \* Genuine materials
- \* Quality guaranteed
- \* Portable & easy to install even in hilly region

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Factory  
Tekusi, University Road  
Phone 214631

advertisement in the  
Rising Nepal, Kathmandu





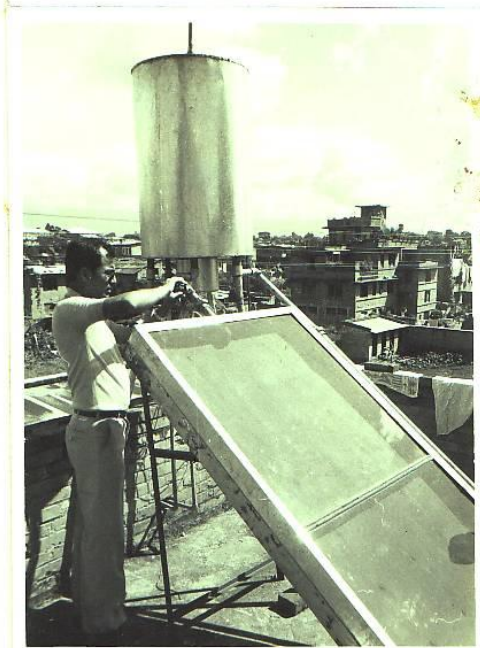
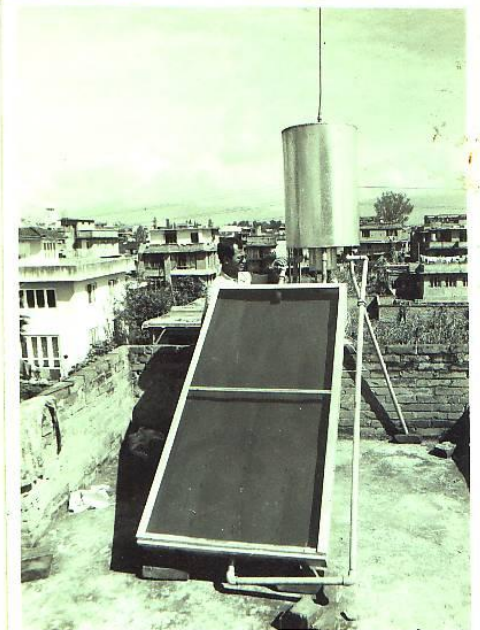
the first successful solar water heater in Ladakh Kashmir, India, elev. 13000' capable of operating throughout the winter with night-time temperatures of  $-30^{\circ}\text{C}$  without freezing. designed by Siang T. Teoh at the S.O.S. Tibetan Childrens Village, Choglamsar, Leh in October 1981, this solar heater produces 250 litres of hot water daily cost : Indian Rs. 1800.00

## SOLAR WATER HEATERS IN THE HIMALAYAS

designed by Siang T. Teoh

prototype low cost high efficiency solar water heater designed by Siang in Kathmandu Nepal 1982. 100 litres at  $65^{\circ}\text{C}$  summer,  $50^{\circ}\text{C}$  winter NRs 5000.00 (US \$ 420.00) now manufactured commercially in Nepal.

flat plate "fully wetted" panel prototype 1983





TEOH SIANG TEIK

## Powered by the Sun: Hot Water on the Cheap

By JOHN COLMEY KUALA LUMPUR

**T**EOH SIANG TEIK DIDN'T SET OUT TO DESIGN THE WORLD'S most powerful solar water heater. He just wanted to go trekking. As an architecture student in Scotland in 1979, the young Malaysian was looking for a way to prolong a visit to Nepal when a local businessman asked him to design a hotel in a rural area with no electricity. His energy-efficient solution won first prize from Scotland's Royal Incorporation of Architects. He returned with his architecture degree and designed 69 rural buildings for the Nepalese government, incorporating solar water heating. "My professors had told me to leave engineering to engineers and be an architect," Teoh recalls. "I was just looking for a way to save money on materials."

That quest resulted in a stunningly simple engineering breakthrough. At the time, there was essentially one way to build solar water heaters, using a 1976 Japanese patent that is still commonly applied today. In that basic design, an array of tubes in a flat glass panel is placed on a slope or roof and connected to a water tank. The water in the tubes is heated by the sun, rises slowly and enters a pipe running across the top of the panel, where it pushes forward and empties into the tank. The circle is completed when cold water is forced out of the bottom of the tank into a pipe running to the bottom of the panel. From there it begins the journey through the panel and back up to the tank again. Standing on the roof of one his houses in Nepal, Teoh was watching the hot water rise and shoot into a black 55-gallon drum when he realized how much heat was being lost pushing the water through the system. Says Teoh: "The first rule of solar water heating was that the tank was separate from the panel" and connected by a single tube. "I knew there had to be a more efficient way."

There was. After pondering the problem for several years, Teoh designed a heater in which each tube in the panel pours hot water directly into the tank. That shortens the path the water has to travel by nearly a meter and thus slashes the energy loss in transport. Building on the notion of reducing resistance to hot water flow, Teoh's research over the next decade led to several more design improvements. For example, he added an additional lower panel with exposed tubes suspended over a mirror that allows the heater to receive additional sunlight and even work on a cloudy day.

Teoh's solar water heater, which was granted one of three international patents issued by the World Intellectual Property Organization (under the Patent Cooperation Treaty) in 1997, outperforms the competition. It guarantees a water temperature of 60-78°C—as opposed to the previous 50-60°C ceiling—more than enough for an entire family of five to take two hot showers a day. Unlike other solar water heaters, it doesn't need an electric-powered backup, which on cloudy days can make operating costs sky-

rocket. And Teoh's model can be built using materials available at a local hardware store. Such simplicity allows the company Teoh has set up in his home, Microsolar Malaysia, to sell heaters for as little as \$1,000. That's one-third the cost of a more technologically sophisticated solar model designed by the U.S. National Aeronautics and Space Administration. Teoh's design not only produces hot water without burning fossil fuels, but it operates more cheaply than other solar models. In the first 10 years, his heater costs a family of five \$100 annually, compared with \$200 for a conventional solar unit with an electric booster and just under that for an all-electric model. "It works," says one of Microsolar Malaysia's 1,000 customers, Affendy Thing, a Kuala Lumpur sales executive. Affendy went solar to help the environment and to avoid buying individual electric heaters for his three bathrooms. He now enjoys "a substantial savings on my monthly bill."

More importantly, Teoh's innovation could unlock many more, including solar air-conditioners. Until now, finding an efficient way to use the sun's energy to cool air has eluded engineers because the water temperature must be maintained at an average 75°C in order to run existing solar air-conditioning models. Currently, five to



CHRIS BROWN—SARA FOR TIME

eight panels are required to reach that temperature, far too cumbersome and costly for a typical roof, where Microsolar could potentially do it with two to four panels. Many air-conditioners now use a volatile gas like freon, which is known to contribute to global warming. So a freon-free model could be a boon for the environment, as well as an important new industry for Malaysia, already a major manufacturer of air-conditioners.

Though Teoh has gained international recognition for his stroke of solar engineering, he remains very much an architect, designing buildings throughout Asia. Microsolar Malaysia plans to franchise his low-cost water heaters to the developing world, beginning with Botswana this year. Nonetheless, Teoh rejects the notion that he is a hero. "I don't like the word," says the inventor. "I just want to be somebody who makes a small contribution to the world." And if he is lucky, he may still have time to go trekking, although the demands of fame are making that increasingly difficult. ■

**KEEPING WARM**  
Heating water with solar power has become cheaper and more efficient, thanks to an architect who dabbles in engineering

It's  
we  
serv  
CNI



© 1999

Time Magazine 1999 April 5 Heroes of the Planet, Asia Edition. Architect Teoh Siang Teik was awarded (one of four worldwide awardees) of the Heroes of the Planet Award 1999 by Time Magazine for his invention of the patented Microsolar Multivalve Heater. The article predicted the invention of the freon-free Microsolar Cooler using the same Multivalve technology (the Microsolar Cooler technology would eventually be developed and patented about 20 years later in 2019.)





Installing 2 units Microsolar Water Heaters and 1 unit Microsolar Cooler at Kenny Hills Kuala Lumpur Malaysia 2021.





2 units Microsolar Water Heater M60VTHE and 1 unit Microsolar Cooler at  
Kenny Hills Bukit Tunku  
Kuala Lumpur Malaysia 2021



2 units Microsolar Coolers at Sierramas Resort Homes  
Sungai Buloh Selangor Malaysia  
April 2022



2 units Microsolar Coolers Sierramas Resort Sungai Buloh Kuala Lumpur Malaysia  
May 2022







Microsolar Heaters from Malaysia on the roof at Harbour Town Yacht Club Hotel,  
149 Lighthouse Road, Hilton Head Island, SC, USA , 2008.  
Pics by American Microsolar





NZ Microsolar Distributor Vince Cowie installing Microsolar M60VTHE At Picton Marina, South Island New Zealand.



Microsolar Heater M60VTHE installed near Picton Marina, South Island New Zealand.





the Bassetts with their Microsolar Heater from Malaysia in Sunbury PA USA, 2009





Microsolar Water Heaters central heating of greenhouses in NC USA and Unity Healing Centre on a Native American Reservation PA USA.





SJK Tsun Jin School Jln Perkasia Kuala Lumpur Malaysia 2021 August  
2 units Microsolar Cooler



SS3 Petaling Jaya Selangor Malaysia Sept 2022.  
Architect Teoh Siang Teik with the Microsolar Cooler.



50 units Microsolar Water Heaters M80VTHE at University Campus and Hotel at Taman Connaught Cheras Kuala Lumpur Malaysia 2017





50 units Microsolar Water Heaters M80VTHE at University Campus and Hotel at Taman Connaught Cheras Kuala Lumpur Malaysia 2017  
Ar Teoh Siang Teik discussion with installation team

**Batunona Dive Resort.**

**Bitung , Lembeh Straits, North Sulawesi, Indonesia. May 2013.**



Microsolar Solar Water Heaters installed at Batunona Dive Resort in the Lembeh Straits, Bitung , North Sulawesi Indonesia. May 2013. With volcanoes Gunung Klabat 1968m elevation to the left background and and Gunung Dua Saudara Tangkoko Batuhangus 1327m elevation the centre background . Some of the best diving in the world is in this area..

These are the new Coastal Specification Microsolars specially rustproofed for marine environment. The Microsolars were shipped from Port Klang Malaysia to Jakarta, then thru the islands to Hujung Pandang Makassar, South Sulawesi then up to Manado , and Bitung in North Sulawesi to the remote Lembeh Straits off Bitung.. There is no road access, all transport is by boat.. The Microsolars provide hot water to the guest rooms without electricity, as electricity is expensive from diesel generators.





Microsolar M80VTHE Water Heaters installed at Bali Med Hospital  
Denpasar Bali Indonesia 2010

## DAIRY FARMS IN SOUTH CAROLINA USA WITH MICROSOLAR HEATERS



Farmer Tom Trantham with Microsolar heaters at Happy Cow Creamery, Pelzer, South Carolina, USA 15 May 2010

The Happy Cow Creamery [www.happycowcreamery.com](http://www.happycowcreamery.com) at 332 McKelvey Road Road, Pelzer, South Carolina, USA is a well known Dairy farm with a unique on the farm milk bottling operation offering high quality fresh milk directly from its own dairy cows. Owner Tom Trantham is also a director of the Rural **Advancement** Foundation International [www.rafiusa.org](http://www.rafiusa.org) , a farmer's cooperative that that supports environmentally sound, sustainable, socially just family farms.

Last Friday 14 May 2010 Tom Trantham, in the quest to use environmentally sustainable energy sources for his farm, installed two units of Microsolar high efficiency solar heaters that deliver 70C hot water for cleaning and sterilising his milking machines. Previously he was using LPG gas or electricity to heat the water, so his energy bills for hot water for milking equipment will be halved, which is a substantial savings for the average dairy **farmer**. The advantages of a high efficiency solar heater over gas are no maintenance or relatively no maintenance, no need for



resupply of gas cylinders and no danger of explosions or gas leakage, and no air pollution. .

Microsolar Water Heaters are the world's highest efficiency thermosyphon solar heaters, with passive solar efficiencies (no circulation pumps, no chemicals, no electricity) of 40.7% as tested by South Africa's Bureau of Standards. They are of a unique patented coaxial multivalve design and are designed and assembled in Malaysia for the international market. Most other solar heaters are of 30% efficiency or less.

The photo shows proud owner Tom Trantham with his newly installed Microsolar heaters at the Happy Cow Creamery in Pelzer South Carolina USA. Installed by American Microsolar [www.americanmicrosolar.com](http://www.americanmicrosolar.com)

How does it work? Conventional solar heaters, may possess efficient solar collector panels per se, with high solar absorption to the collector, but they unfortunately stifle hot water circulation by having only one small horizontal pipe connection only between their collector panel and tank. This requires a circulation pump to overcome the bottleneck effect of the inefficient single connection pipe and is also subject to pumping losses between the collectors and remote tank. Microsolar does not stifle the natural solar convection, it has 30 large vertical heating pipes directly into the tank from the collector panel, with no bottlenecks, no pumps, no horizontal pipes between collector and tank. Hot water in nature rises vertically, while horizontal pipes and single pipe bottlenecks retard the free flow of rising hot water from the solar collector panel into the tank.

The Microsolar comes with a pressurized indirect heating copper twin coil heat exchanger for durability and sediment resistant low maintenance, using the latest robotic tungsten argon gas welding stainless steel 304 hot water storage tanks, mirror finish 304 stainless steel concentrating parabolic reflectors, 60mm high pressure injected polyurethane foam insulation, and high temperature borosilicate evacuated glass vacuum tubes 58mm x 1800mm.

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website: [www.microsolarsystem.com](http://www.microsolarsystem.com) email: [microsolar@hotmail.com](mailto:microsolar@hotmail.com)