

The Oil Drum: Campfire

Discussions about Energy and Our Future

Household Dry Food Cooking, Part 2

Posted by [Debbie Cook](#) on May 20, 2010 - 10:26am in [The Oil Drum: Campfire](#)

Topic: [Environment/Sustainability](#)

Tags: [craig bergland](#), [solar cooker](#) [[list all tags](#)]

This is a guest post by Craig Bergland, whose handle is [renofreepress](#) here at The Oil Drum. Craig built his first two solar water heaters at age 18. Now 61, he is a lifelong conservationist whose passion is turning the waste of one process into the resource for another. He is currently saving plastics in hopes to be able to melt them to casting temperatures or for injection molding to replace parts for our toys. Craig hopes to reach our youth to encourage them to get involved in building simple solar devices, including showing them how to easily build a parabolic form. He is looking for help in designing tracking mechanisms for solar devices. Craig worked 35 years in the casino industry, including working on design teams for new equipment, and teaching electronics/slot repair. In 2006 Craig was the Green Party candidate for Nevada Governor. In 2008 he ran for the House of Representatives.

This is to expand on a campfire post I submitted on [April 9, 2009](#), which was primordially inspired by [Jason Bradford](#), so call this part 2. Having learned a lot in the last year, I want to share what has morphed into a pretty nice cooking kit. After Debbie Cook's recent post here about it being time to do [Epic Shit](#), perhaps it's time to continue on with simple solar cooking.

This is a guest post by Craig Bergland on how to build your own inexpensive solar cooker. His handle is [renofreepress](#) here at The Oil Drum.

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Commercial box ovens run around \$300, and homemade cardboard ones do not have a good life span due to weathering, etc. I call this device the square foot solar cooker, and you can make one for under \$10 (for the complete kit) if you are willing to do a little scrounging.

For about \$12, you can buy a set of six mirrors (you need 3) from your hardware store. These are

a foot square, and are often used for tiling bathrooms, and some quirky folks' ceilings above the bed. Don't buy the beveled-edge set, they're twice as expensive.

You can fasten the mirrors together with duct tape, as shown below, and the unit can be either collapsible/portable, or permanent (with the addition of some silicon sealant around the inside corners).





It is a good idea to put a square of duct tape on the bottom (base) mirror, to keep it from hitting cement and breaking. Also, a run of scotch tape along the edges of the mirrors that touch together is a good idea to keep the mirrors from chipping when you fold them up. You could alternatively build reflectors out of cardboard and foil for nearly free, as they perform almost as well. For more on construction details please visit my post on the [cooker](#).

The second component of the cooker is double jars. A large outer gallon jar covering a blackened inner quart sized cooking jar provides double jar insulation, and you can easily reach boiling temperatures. The inner jar should be a high-quality canning jar, painted black, with a stripe down one side for viewing the cooked foods, and to see if it needs more water. Again check the above link.

The outer jars can be purchased from a local bar (olive and cherry containers work well) or tip the barkeeper a dollar to save you a couple of them. They come in glass, #1PET plastic, or #5 PP plastic. Any of them will work well, but the PET types seem superior as they accept all wide mouth quart-sized canning jars, and heat up more rapidly than glass. Glass does last longer if you don't break it. However, I really like the Square Foot Cooker, as it is pretty impervious to weather, and with care will outlast all of us.

By adding a one-quart brown beer bottle, and drilling a one-inch hole in the outer-jar plastic lid, you can make a water purifier that will easily disinfect a quart of water in an afternoon. This one-inch hole, by the way, will allow you to insert a wine-bubbler into the outer jar lid, if and when you decide to make some homemade wine. I would recommend that you have your bartender save you about 4 or 5 of these gallon jars, so that you can simultaneously cook food, purify water, and be brewing a couple of batches of nice raisin sherry.



I will admit that this unit, with the addition of a foot of 3/8 'U' shaped copper tubing and a cork, will distill water. And I can say with good certain-certainty, that it will also distill alcohol, although it is illegal to do that without a permit, in some locales.



While I don't know for certain, let me suggest that a quart of home-made wine could theoretically yield 5 ounces of high octane alcohol fuel in an afternoon. And if I send off for a permit to make my own 'gasohol,' I'll let you know the results. My 8-year old 100mpg scooter, in theory, could be adapted to run on pure alcohol.

For you math and physics folks, below is a chart of a recent test I did on the heat-capabilities of 2 kinds of outer jars, the plastic ones. It was conducted on April 6, 2010, on a mostly sunny day with an outside temperature of 44 degrees. The one-quart test jars were at 48 degrees.



As shown from left to right are the 5 test units. Measurements were made every 10 minutes, and here are the results in degrees Fahrenheit.

	Jar 1	Jar 2	Jar 3	Jar 4	Jar 5
After 20 minutes	56	56	76	75	65
After 40 minutes	63	64	99	95	91
After 60 minutes	68	70	111	111	107
After 120 minutes	77	82	133	142	137
After 240 minutes	88	103	164	190	177
After 320 minutes	91	111	178	207	202

Here are my conclusions. The PET jar heats fastest (faster than glass, a later test...), although it seems any jar with the reflector will reach both disinfecting temperatures (arguably somewhere between 125 and 160 degrees), and each will reach the evaporating temperature to separate alcohol from water which is apparently somewhere around 185 degrees.

If one could intermittently run a small single cylinder engine (moped/scooter, 4 stroke?) on alcohol, then it should be possible to mate the driving wheel up to some kind of mechanical contrivances, for example, the old-timey system of belts and pulleys to run shop machines, sewing machines, etc. Or, one could in theory power a couple of car generators, or water pumps or

big-ass fans or a combination of all of the above. I hope there will be some discussion of this here?

The next project is to be my first attempt at making homemade cheese. This requires temperatures of between 110 and 180 degrees, depending upon what kind of cheese you're making, and this cooker should be able to easily accomplish that. I would suspect that the very slow heating system here will provide superior cheese because of its gentleness, but that remains to be seen.

And finally, as stated somewhere else here, I have used this to pressure cook soybeans. That is an awesome feat, as soy is not done until it is very squishy.

One might even be able to use this as a 'waterless' canner...?

I've got a quart of rice we cooked on Earth Day, that still does not give off a nasty decomposition smell, although it's starting to turn just a bit ripe as I keep opening it to check. It was still sweet smelling a week ago.

I hope that some of you will build one or two of these, and let us all know what capabilities you find. It should be able to bake bread, cook meats, and do much low-volume semi-high heat functions.

Also, a last nice thing to know is that you can use this to cook your evening's rice etc., if in the morning you point the mirrors to about the 6:00 PM position where the sun will be then. When you get home from work, your food will be piping toasty hot, absolutely un-burnt, and waiting for you.

For the cost of 2 packs of mirrors (\$25) you can build 4 cookers that will give you a gallon of cooked foods or whatever on a good sunny afternoon. This pretty much seriously rivals a domestic \$300 solar oven. Admittedly, we only use about 3% of our energy for cooking food, but a BTU saved is a BTU earned in my opinion.

Now clotheslines, they're probably even more efficient, but we'll save that for another day.

Thanks for your attention, and I eagerly look forward to replies and discussion.



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