

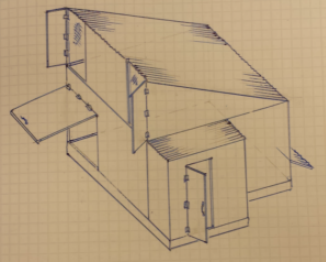
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## Small Green House

## Small (Home Made) Greenhouse

“Plans”



We did a lot of research into home-made greenhouses and looked into features such as materials, exposure, heating-cooling-ventilation, plumbing, and power. Our plans consisted of the sketch to the left and a little bit of math to determine the angle of the roof. We deviated a little from the plans, but for the most part, we stuck to them pretty closely.

## **Location Location Location**



Our choice of location was somewhat limited because we wanted to save the best site for a bigger greenhouse that we were planning to buy in the coming year. The east side of our barn was selected because it is a convenient location, it has a water source (rain runoff from the barn's roof), it is relatively level ground, and there is a decent amount of light.

## **Foundation**



We “dug” the foundation to measure about 16’ on each side... because that’s the size of the lumber we had to start with. It didn’t take much work with the tractor to remove the topsoil and get down to the clay and shale. We also dug a trench for a footer of sorts, and post-holes for the concrete supports.

## Framing



The building is framed with 4 x 4 posts in the corners and mid-points of each wall. Then we put 2 x 4 studs for the walls. You can see the polycarbonate roof in this picture, and the exterior half-inch plywood walls. We used 2 x 12 band boards at ground level and filled in the floor with #10 gravel about 6 inches deep (deeper around the perimeter). The solid walls and doors are all insulated with R-13 fiberglass.

## Ready(ish) to use



Here is the finished (almost) product. You can see two 4' square vent openings in the lower left, and a 4' x 8' opening in the upper right (back). The doors all have 1/2" hardware cloth to keep out the critters and birds, and they can be opened to let in fresh air. You can also see the rain collection system that routes rain that hits the barn and greenhouse roofs and routes it away from the greenhouse foundation and into a catch barrel (installed later). Excess water then runs out a buried 4" corrugated drain pipe.



Here is the entrance to greenhouse. It leads to a wood-floor 4' x 8' room where we store equipment, fertilizer, tools, and other stuff.

## Loft



The greenhouse peak is 16' high so there is room for a loft area where we can either store equipment, or grow plants in the winter, where it's the warmest part of the greenhouse. We quickly discovered how bad single-layer polycarbonate insulates. Since there was *some* leftover polycarbonate, we added an interior layer of the material, greatly improving the ability of the greenhouse to retain

heat.



## “Plumbing”



This is a 55 gallon food-grade barrel (once used to transport a lot of hot peppers). We cleaned it out and turned it into a rain catchment system. It has a clear tube that runs top-to-bottom so we can tell how full/empty it is. We use Uniseals rather than typical bulkhead fittings because they are inexpensive, easy to use, and they work very well.



We also installed a 2” drain pipe that lets us drain water

from inside the greenhouse to the yard, about 20' feet away. We have plans for a large and small sink.

## Aquaponics System



This is our small hydroponics system. It has more than 300 positions for growing produce like lettuce, herbs, and small vegetable plants.

The water is supplied by a 110 volt pump that sits in the bottom of the blue barrel in the lower right of the picture. Water rises through a 1/2" tube that supplies the 10 upper (2 inch) pipes via 1/8" tubing. The pipes are slightly tilted to the left where they drain into the lower 5 pipes (3 inch). The lower pipes drain back into the blue barrel through 3/4" tubes.

## Solar Power System



In order to provide power for water pumps, lights, fans, and incidental devices, we installed a small solar power system. We put four 100 Watt solar panels on the roof of the barn using 2 x 4s.



There is a small charge controller that will handle the four solar panels, plus four more 100 Watt panels, if we add them later.



The controller charges four 12 Volt, 90 Amp-



Hour deep cycle batteries.

The batteries power the inverter, that supplies electricity to the hydroponics system, lights, and fans. This is actually the second inverter we've used. The first was "lost" during during a storm and lightening might have been the culprit... GROUND your electronics!

## Finished Greenhouse



Here are some pictures of the finished greenhouse. We're constantly fixing and improving, so we'll add more pictures and descriptions as we go along.





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