

Hello and thank you for downloading the free Portable Solar Power Sled Do-It-Yourself plans. This is an easy DIY project with minimal cutting and assembly, so simple even a cave...well you get the idea. I built the base for the Solar Sled from easily accessible standard size parts. A few pointers before starting:

- Safety first, please wear safety goggles when cutting, especially the metal frame for the “Sled”
- Work gloves, metal can cause serious cuts
- Measure twice, cut once, always good advise
- Construct your Sled in an area where you have room to work, this is not a kitchen tabletop project, preferably in a well ventilated space
- Have all your parts together, the list of parts is included; most of non-solar parts are available from Home Depot or other hardware suppliers. The non-solar parts can be bought online as well. The solar parts are available at <http://www.icandosolar.com>.
- The frame is constructed from 1-1/4” x 72” slotted angle, substitution in length i.e. 60” or 48” is ok, it may result in more/less cutting and waste but if the supplier only has 48” or 60” in stock when you go to the store, you can still build the Sled
- I will reference the Home Depot part numbers (UPC), when possible, for the non-solar parts
- I used slotted angles to minimize drilling

## Tools

- Hack saw or chop saw
- Miter Box
- Metal File
- Drill w/ 3/8" bit
- 3/8 wrenches
- Measuring tape
- Pencil
- Straight edge or square

## Parts List

### Base and Panel Frame

- 4 pieces -1-1/4 x 72" slotted angle – remember you can use precut slotted angle, the cost per foot is a little higher
- 1 piece - 2'x4'x1/2" plywood, UPC 099167457208, 2' x 4' x 3/4" if you plan to use larger 75 watt panels and/or multiple batteries
- 1 package - 4" swivel casters; Home Depot offers these in a 4 pack, UPC 672763103221
- 1 package - 3/8" Create-A-Bolt (includes 6 pieces each hex nut, flat washer, lock washer) UPC 03069905192
- 3/8 x1-1/4 hex bolts to bolt the panel frame to the base
- 1/2 PVC pipe and fittings, the pictured version was constructed with a 20 watt panel which is not very heavy
- PVC Glue

### Solar and Other Parts

- Mini-Solar Gen (please see sizing chart), the chart list the manufactures suggested panel and battery sizes, you can use small panel (or panels) to construct the sled; it will take longer for the system to charge. I used a MSG800 with a 20 watt panel.
- Solar Panels (please see sizing chart and note above)
- Marine Battery
  - Units used indoors require a **sealed** battery
  - Units used outdoors can use vented or sealed battery
  - Battery Box, optional, allows the battery to be secured to the base, available at any marine supply (I went to West Marine)

Mini Solar-Gen System Chart					
Model	Max PV Amps	Daily Use	Short Term	1 to 2 Days	Uses
MSG400-12B	7	120 watt PV 50 a/hr Battery	80 watt PV 50 a/hr Battery	40 watt PV 30 a/hr Battery	Lights; small power tools, laptops; DVD player
MSG700-10SE	10	200 watt PV 2 - 85 a/hr Battery	100 watt PV 100 a/hr Battery	50 watt PV 85 a/hr Battery	Power tools - 4 amps max; TV; electric cooler
MSG800	15	360 watt PV 50 a/hr Battery	200 watt PV 100 a/hr Battery	50 watt PV 85 a/hr Battery	PA amps; PC; small kitchen appliances
MSG1000-12B	5	75 Watt PV 200 a/hr Battery	50 Watt PV 100 a/hr Battery	30 Watt PV 85 a/hr Battery	Power tools(8 amp max) AC, Water Pumps
MSG1000-12	10	150 watt PV 2@ 85 a/hr Battery	100 watt PV 100 a/hr Battery	60 Watt PV 85 a/hr Battery	Power tools(8 amp max) AC, Water Pumps, 12 volt appliances
MSG1250	10	200 watt PV 2- 85 a/hr Battery	100 watt PV 100 a/hr Battery	50 watt PV 85 a/hr Battery	Small Refrigerator; Power Tool - 10 amps max
MSG2000	15	460 watt PV 400 a/hr Battery	200 watt PV 200 a/hr Battery	100 watt PV 100 a/hr Battery	Toaster; Teapot; Refrigerator; Air Conditioner

Notes:

a/hr: ampere hour

PV: Photo Voltaic panel (or panels)

So let's get started...

### Building the base frame

1. Cut the slotted angle to the following lengths (or just use precut sizes)
  - a. 2 pieces @ 24"
  - b. 2 pieces @ 48"
2. Place the 48 inch sections parallel to each other and about 2 feet apart with the "L" facing each other

3. Slide the 24 inch angle under the ends of each of the 48" sections to form a rectangle
4. Place the 1/2 or 3/4 plywood into the frame, verify the fit, this also helps to square the base
5. Drill 3/8" holes in each corner. Look underneath the base, drill the hole where the angles overlap.



6. Insert the caster, place a lock washer and nut, tighten, and repeat for all corners: 2 of the casters are fixed 2 are locking, place the locking casters on one "short" end and the fixed casters on the other.
7. Flip the base over.
8. **Build the panel frame. Base:** Dry fit before gluing PVC Pipe. For the 20 watt panel, as shown, 1/2" PVC is sufficient to hold the panel.

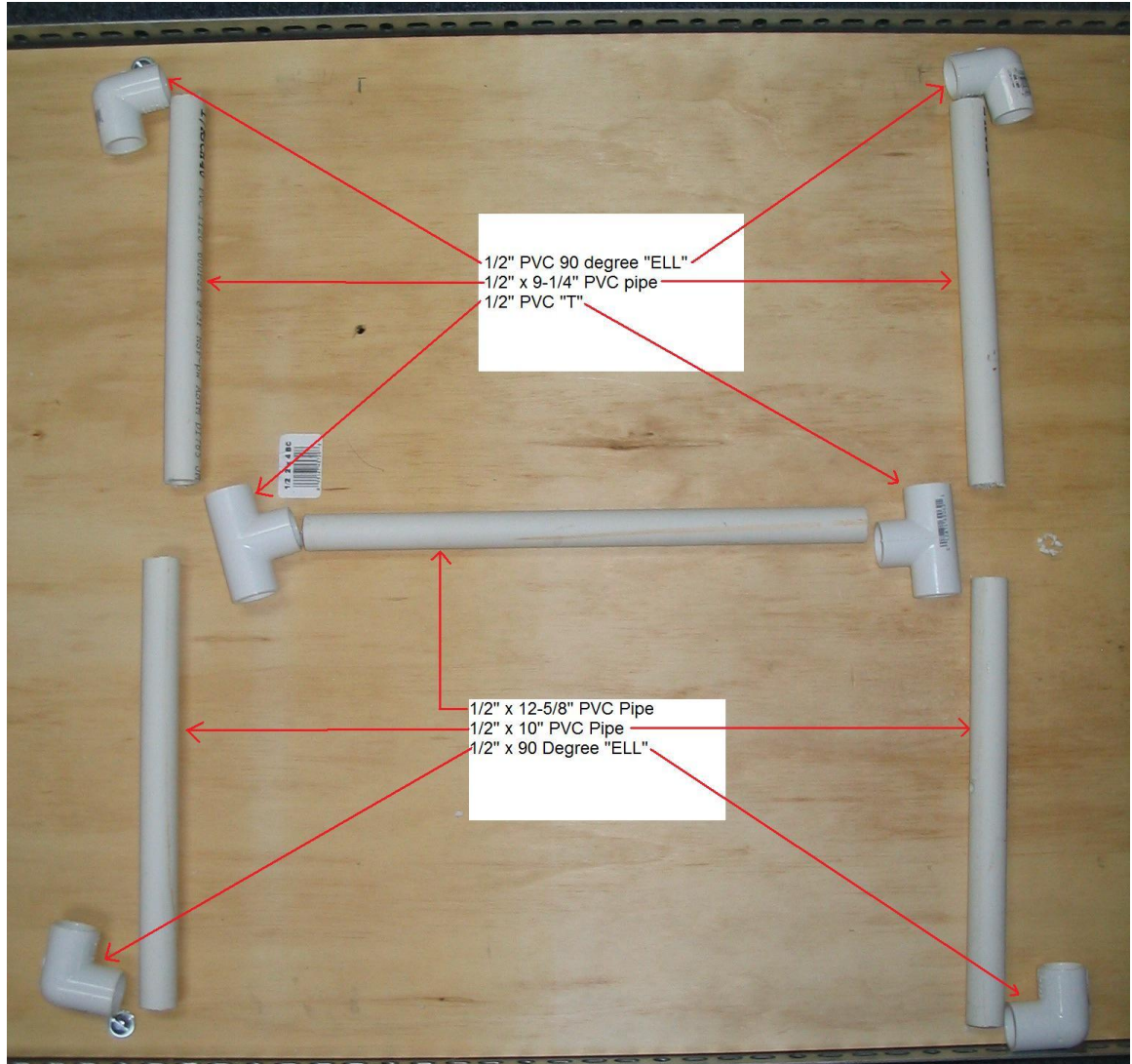
**Cut the PVC Pipe as follows:**

- a. 2 pieces PVC Pipe @ 9-1/4" long
- b. 2 pieces PVC Pipe @ 10" long
- c. 1 piece PVC Pipe @ 12-5/8" long

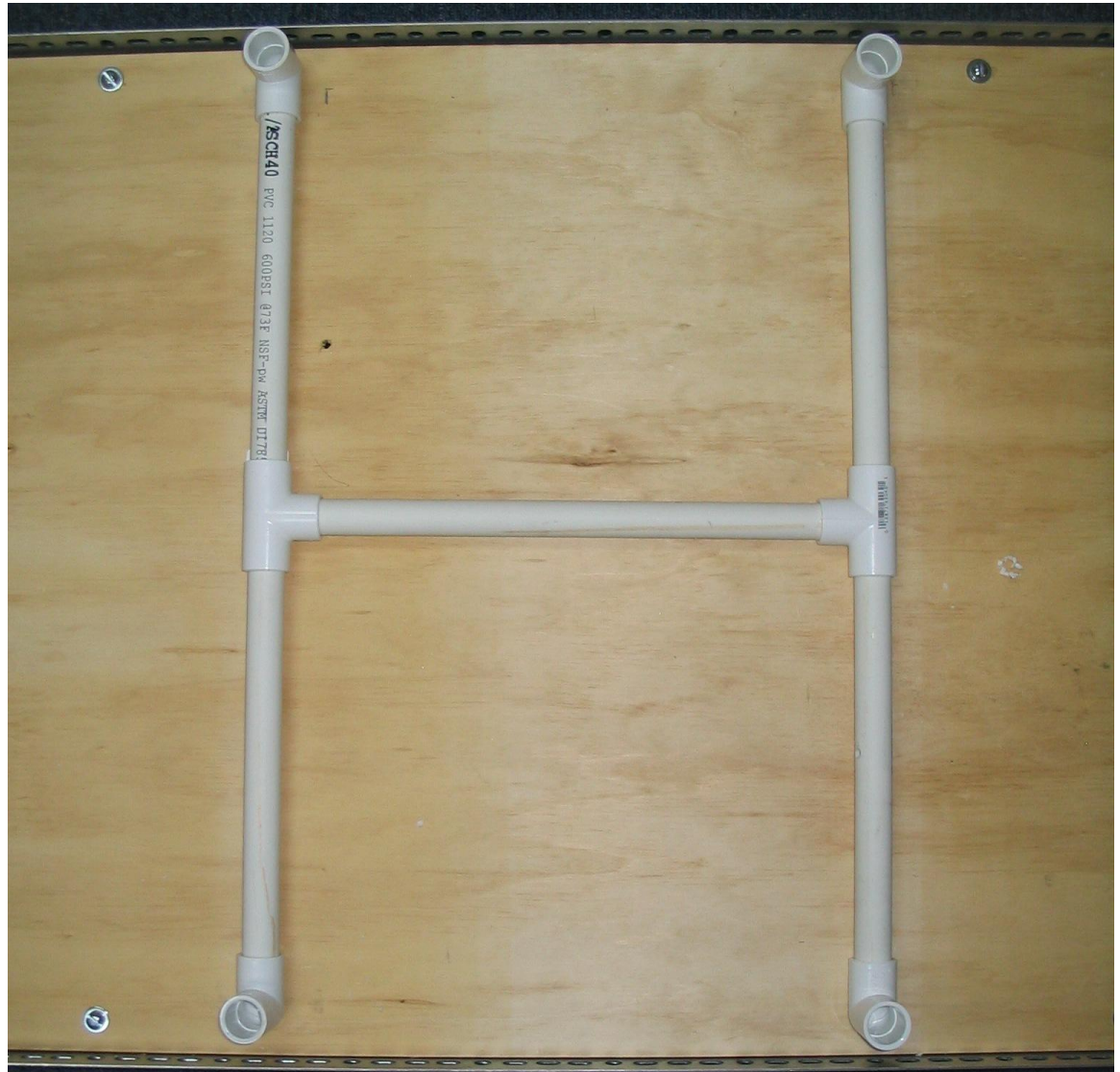
**Connect the PVC Pipe and Fittings as follows:**

- d. Connect (1) 90° angle to each 9-1/4" piece of pipe, point open end of the angle in the up position
- e. Connect (1) 90° angle to each 10" piece of pipe, point open end of the angle in the up position
- f. Connect straight sections to the "T" fitting
- g. Connect the 12-5/8" section of pipe to the "T"

## PANEL FRAME BASE EXPLODED VIEW



## PANEL FRAME BASE CONNECTED



9. **Build the panel frame. Back Support:** Dry fit before gluing PVC Pipe  
**Cut the PVC Pipe as follows:**

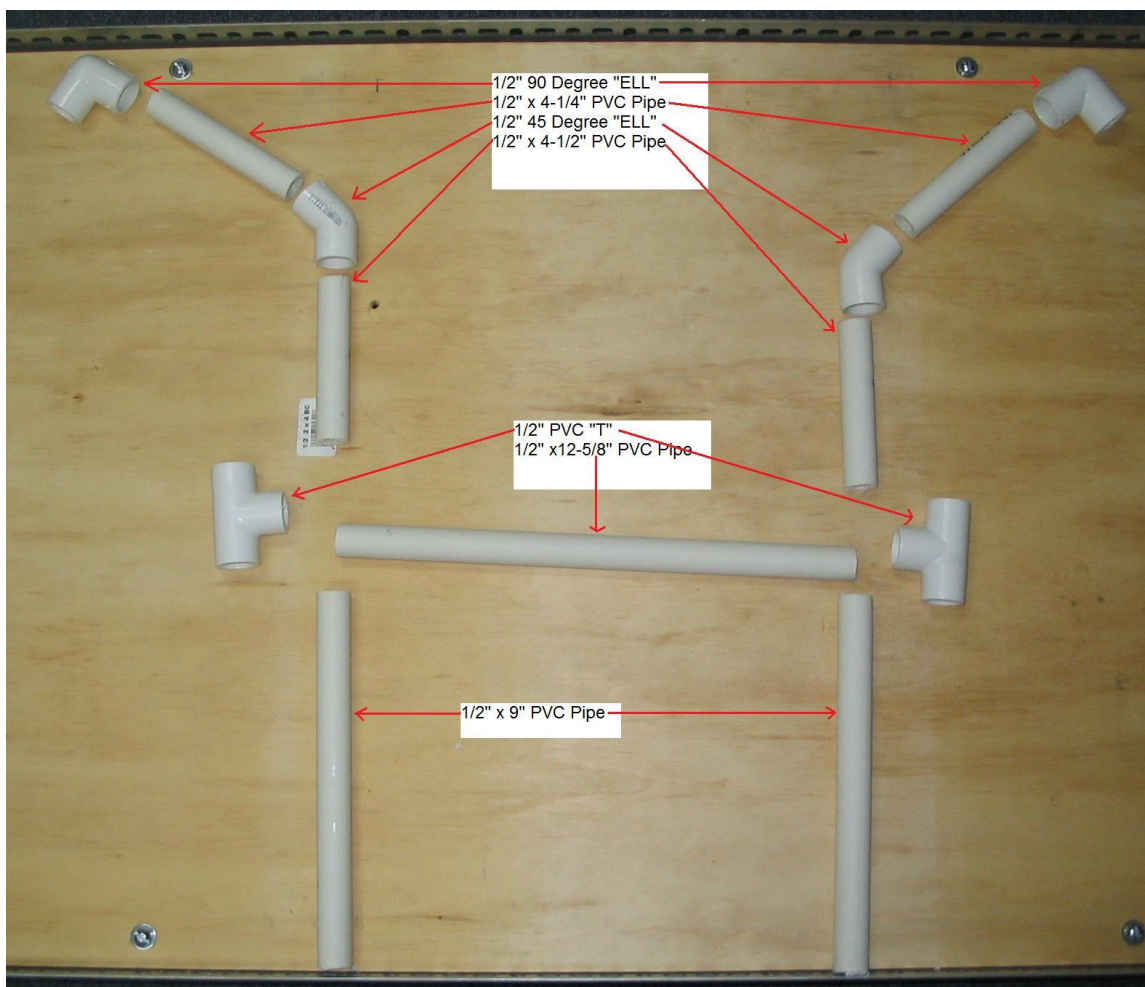
- a. 2 pieces PVC Pipe @ 4-1/4" long
- b. 2 pieces PVC Pipe @ 4-1/2" long
- c. 2 pieces PVC Pipe @ 9" long
- d. 1 piece PVC Pipe @ 12-5/8" long

**Connect the PVC Pipe and Fittings as follows:**

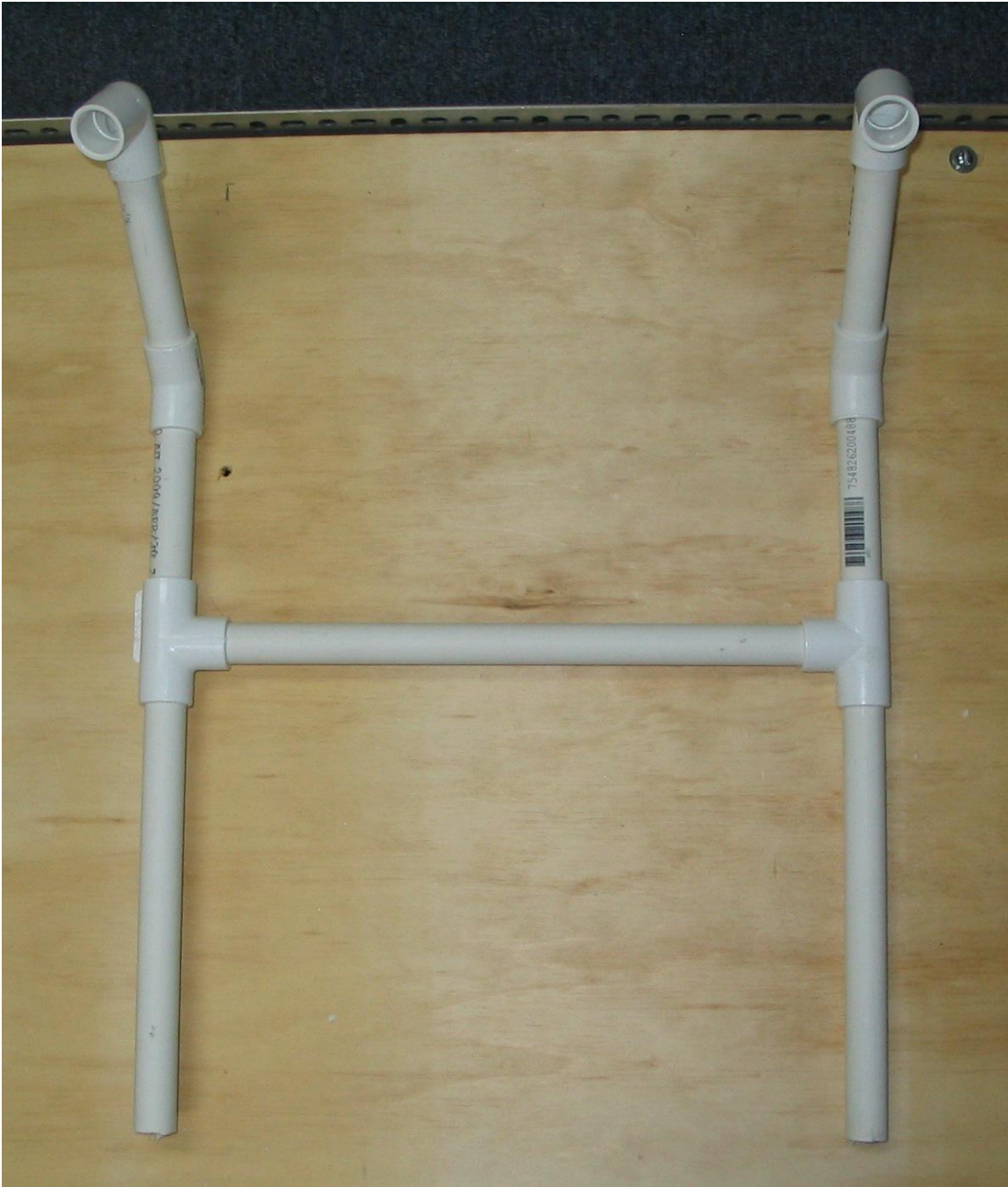
- e. Connect "T" to the 9" piece of PVC pipe (2 times)
- f. Connect "T" to 12-5/8" piece of PVC pipe to form a "H"
- g. Connect 90° to the other end of the 9" pieces of PVC pipe
- h. Connect 4-1/2" piece of pipe to the open end of the "T" fitting (2 times)

- i. Connect 45° “ELL” to the 4-1/2” piece of pipe (2 times), turn 45 so it points up
- j. Connect 4-1/4” piece of pipe to other end of 45° “ELL”
- k. Connect 90° “ELL” to 4-1/2” piece of pipe

### PANEL FRAME BACK EXPLODED VIEW




## PANEL FRAME BACK CONNECTED VIEW

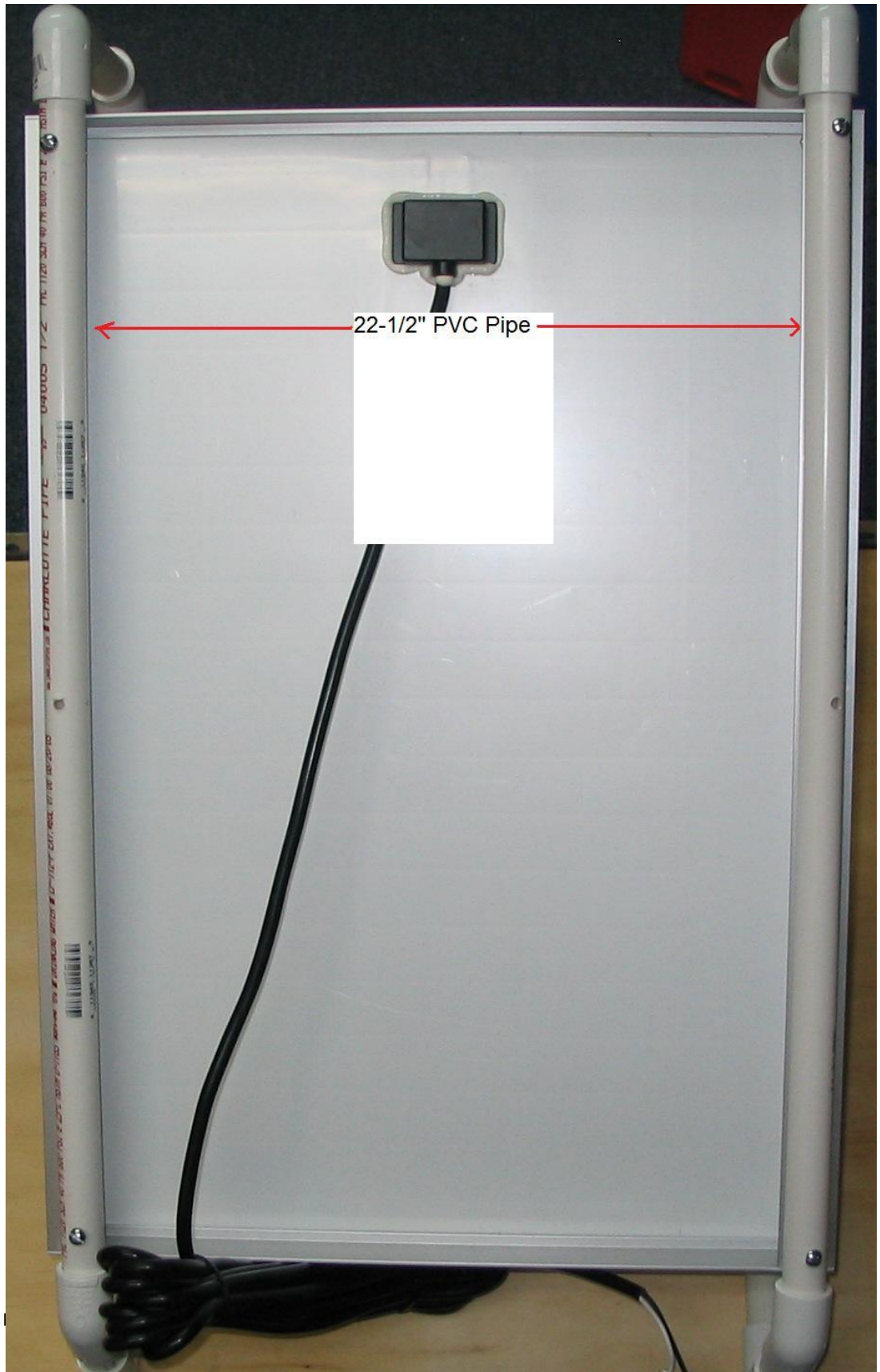


### 10. Build the panel frame. Panel Supports

- a. Cut 2 pieces of pipe at 2" long

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- b. Cut 2 pieces of PVC pipe @ 22-1/2"
  - c. Insert the 2" pipe into the front up-pointing 90° "ELL"
  - d. Attach a 45° "ELL" to the upright 2" piece of pipe
  - e. Insert (1) 22-12" pipe into the base 45° "ELL" and the top 90° "ELL" on each side (shown with the panel install, viewed from the backside of the panel)



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## 11. Install the Battery

- a. Install the Strap Mounts for the Battery Box, use wood screws to attach the straps directly to the wood base per the battery box manufacturers instructions
- b. Thread the strap through the Strap Mounts
- c. Set box on top of the straps
- d. Set the battery in the box



## 12. Install the Mini-Solar-Gen (MSG) & Make Connections

- a. The MSG is pre-mounted on plywood and can place anywhere on the plywood base, the exact location is dependent on the size and quantity of panels and battery (or batteries). In this simple configuration I placed the MSG in the center of the base to facilitate connections.
- b. Using the alligator clamps connect the MSG to the battery; verify that the positive cable is connected to the positive battery terminal and the negative cable to the negative battery terminal.
- c. Connect the solar panel to the MSG with the connector included with the MSG

**Caution:** Always connect Battery to MSG before connecting PV panel to avoid possible damage to the MSG charge controller.



Do Not Use outdoors in WET or High Humidity environment such as rain or dense Fog weather conditions.

Possible Issues:

1. Battery is not fully charged. If the battery is not fully charged you may hear a high pitch noise coming from the MSG that will indicate a low charged battery. A multimeter can be used to measure if the battery is charged
2. Verify the connection from the panel (or panels) to the MSG, if the connection is reversed the battery may not charge.