

## 2015 PROJECT--Thru-wall solar cooker prefab parts, door frame and reflector box

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Joel H. Goodman joelgoodman3@hotmail.com

The two main prefabricated parts that fit together for a thru-reflector wall solar cooker for a house are the cookware door frame and attached nonimaging fixed reflector box (unglazed). This project is for a low cost house with earthen masonry, compressed stabilized earthen block (CSEB) walls (24cm thick/around 9.5in). A construction sequence plan is the two prefabricated parts are transported to a house construction site and attached together in alignment as they are placed securely on partly built walls in accord with the specified counter height above the finished floor level of the kitchen. The reflector area on the cooker door-frame is part of a larger reflector area on a nonimaging shaped masonry wall, one side of a short EW line CPC trough.

Design, fabricate prototypes, and cost estimate a thru-masonry-wall solar nonimaging fixed reflector unglazed cooker reflector box and door frame for mass production. Select a site latitude range and masonry wall thickness. Select a target cooker e.g., the steel 3-Pound Roaster (9.75 inches/24.77 cm diameter x 5.75 inches height) offered by SCI, with improved cooker-bag cover-glazing. This project is for low cost small houses with low cost building materials and CSEB (compact stabilized earth blocks) walls are suggested for this project for possible coordination with the Earth Architecture program of UNESCO. Consider masonry shrinkage and construction accuracy tolerances. Select a top-hinged non-insulated solar cooker door size made of a rectangular frame with attached anodized reflective aluminum based on clearance for the selected cookware that will slide in-out of the cooking solar caustic zone thru the door. The part of the prefab wall directly above the cooker door should not overhang the reflector box for gluing flat glass mirrors without mechanical fasteners, and the incline is related to the latitude of the selected region. The unglazed reflector box has a horizontal inlet aperture. A grill is supported on posts for sliding cookware in-out of the cooking zone above a ridged or pyramid shape reflector area. The reflector box is sized so that the selected cookware is blocked from wind. A full size mock-up physical model of a solar cooker door frame is pictured. The manufacturing process is for mass production and cost estimate selected production quantities: 100, 1000, 10,000. Evaluate injection molding manufacturing and 3d printing with bio-plastics and recycled materials. Materials should be insect-termite resistant and durable in high humidity regions. Quantify thermal energy process requirements.

