Our Clients
La Mision Children’s Fund (LMCF) is a non-profit offering resources to reduce poverty and improve the basic environment for the children and youth in Baja California, Mexico.

With introduction from LMCF, we met Hacienda de la Inmaculada, an orphanage for 50 children and teens. It is located in east Tijuana, easily accessible from the San Ysidro Border.

Project Mission
Hacienda de la Inmaculada is a two-story house with modern equipment located in a suburban area. Currently, the orphanage uses four propane water heaters for its domestic hot water use and spends a significant amount of money on energy. Every child takes a shower in the evening, and ten washing machines are constantly running every day.

By providing a solar-powered water heating system to the girls’ dormitory, boys’ dormitory, laundry room, and kitchen, we want to help Hacienda de la Inmaculada have a sustainable and reliable source of hot water. We also want to inspire the local community to move towards cleaner and more sustainable energy use with this project.

As an abundant renewable source of energy in Baja California, solar energy will be the topic for our team. We hope to proceed with this humanitarian engineering project in other orphanages in Baja California.

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Thermal Collector - Frame
The frame will be primarily made out of pressure treated plywood for the base and the sides. A sealant may be applied to protect the collector and lengthen its life time. The bottom will be insulated with insulating foam. An absorber sheet made of black spray-painted aluminum will rest on top of the insulating foam. A removable plexiglass cover will protect the piping from the environment. The entire frame will be mounted on the roof using specialised mounts for roof shingles, and will be positioned in a southern facing direction with a angled tilt to maximize the incident solar radiation (and therefore heating) during the winter season.

Thermal Collector - Pipe
Prototypes are being planned currently with two different piping material options, to maximize efficiency while minimizing cost. The first option is straight Type M copper pipes, soldered at T joints to form a grid. The second option is coiled PEX tubing. Both materials have good thermal conductivity and are commonly used in water piping systems.

Pipes from the tank will carry cold water to the solar thermal collector. Water will enter the thermal collector and one end, travel through the pipings while absorbing solar thermal energy, and exit through the other end. Pipes will then take the heated water back to the tanks, ready to be used.

System Integration
A scale model of the Baja Solar Thermal Water Heater and the buildings of Hacienda de la Inmaculada has been drawn with CAD in order to better plan and implement the systems at the orphanage.

In addition to CAD drawings, the System Integration team is in charge of investigating how each component of solar thermal water heater system can be connected to each other.

Installation Design Plan (IDP)
As the implementation requires help from professional plumbers and construction workers, the IDP team is working on organizing system diagram, electrical power diagram, and floor plan. Currently, the subteam is working on IDPs of the four different sections: girls’ dorm, boys’ dorm, laundry, and kitchen.

Also, those data will be shared with the beneficiaries for their future reference. If the orphanage choose to make some alteration such blueprints will be crucial information for their possible upgrade in system.

Source: http://www.waraby.net