

Solar Hot Water System for a Greenhouse



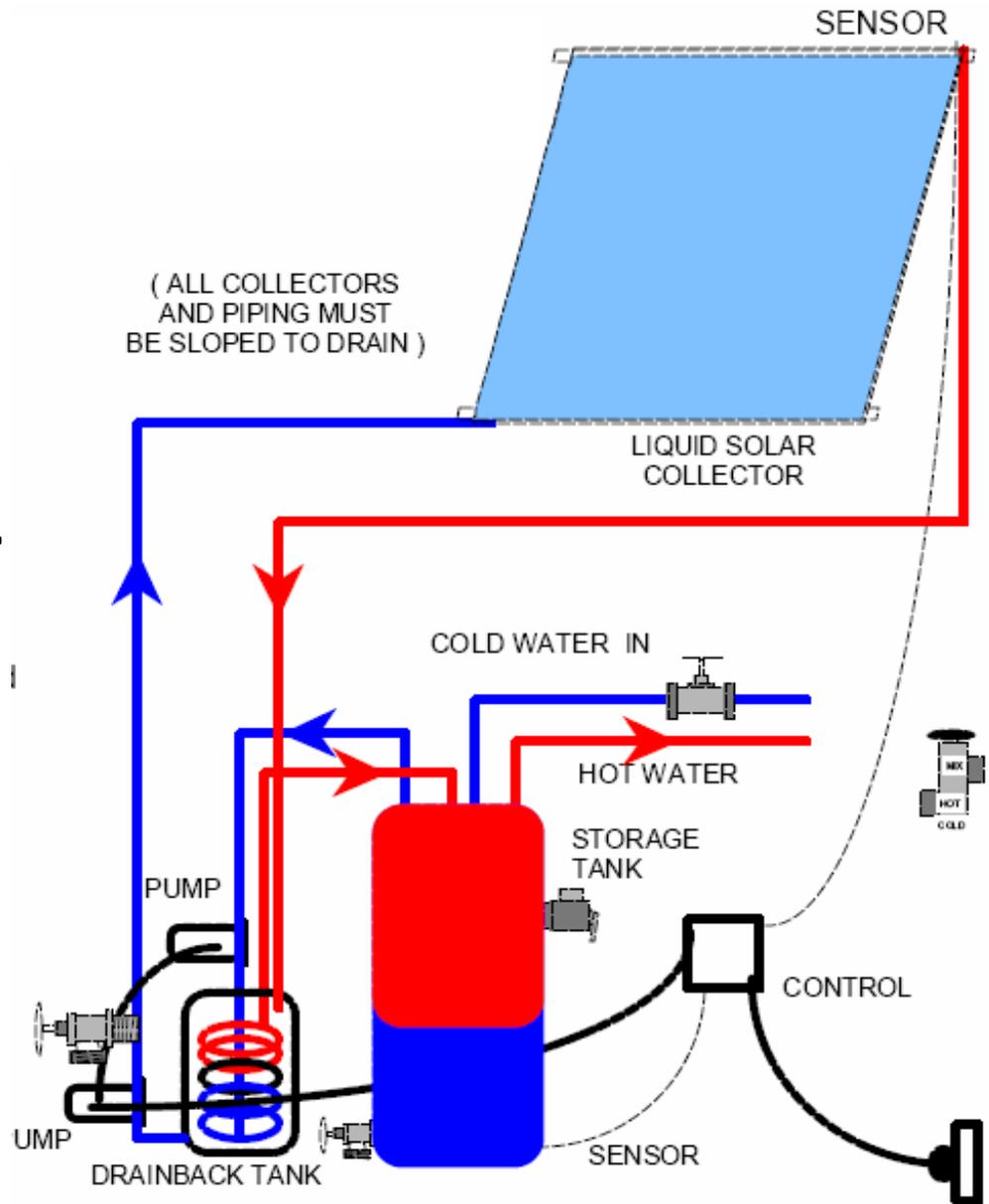
Solar Hot Water for Space Heating in a Greenhouse

The purpose of this system is to illustrate the different space heating applications for a greenhouse.

The long-term goal is to transfer the technology to production greenhouse throughout the state.

Solar collectors heat water.

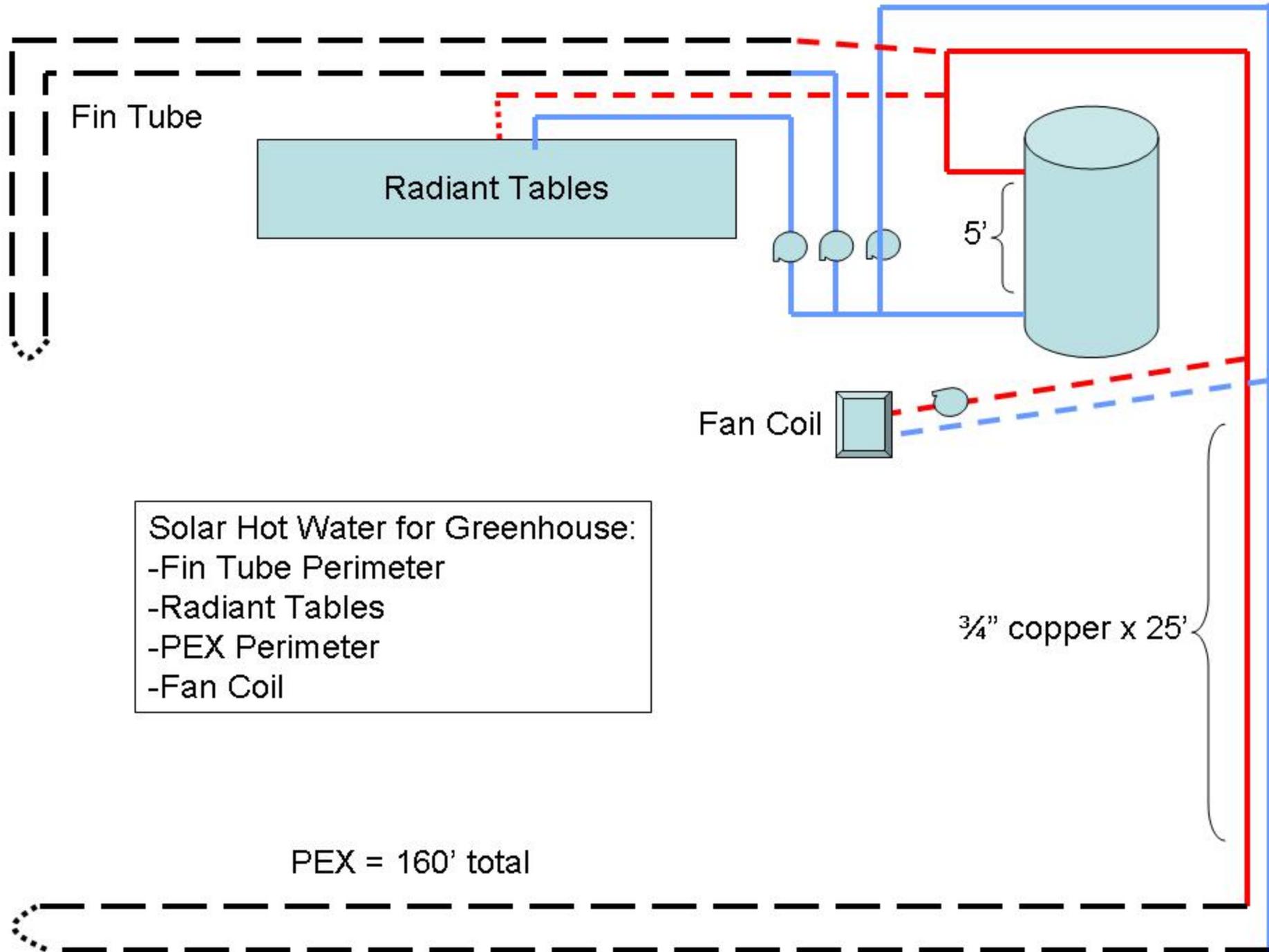
The heated water is stored in an insulated tank in the corner of the greenhouse.



Solar Heating a Greenhouse

The water is circulated through four different circuits for space heating;

1. perimeter fin tube,
2. tubing underneath plant tables,
3. perimeter PEX tube, and
4. a water to air fan coil.



Solar Hot Water for Greenhouse:

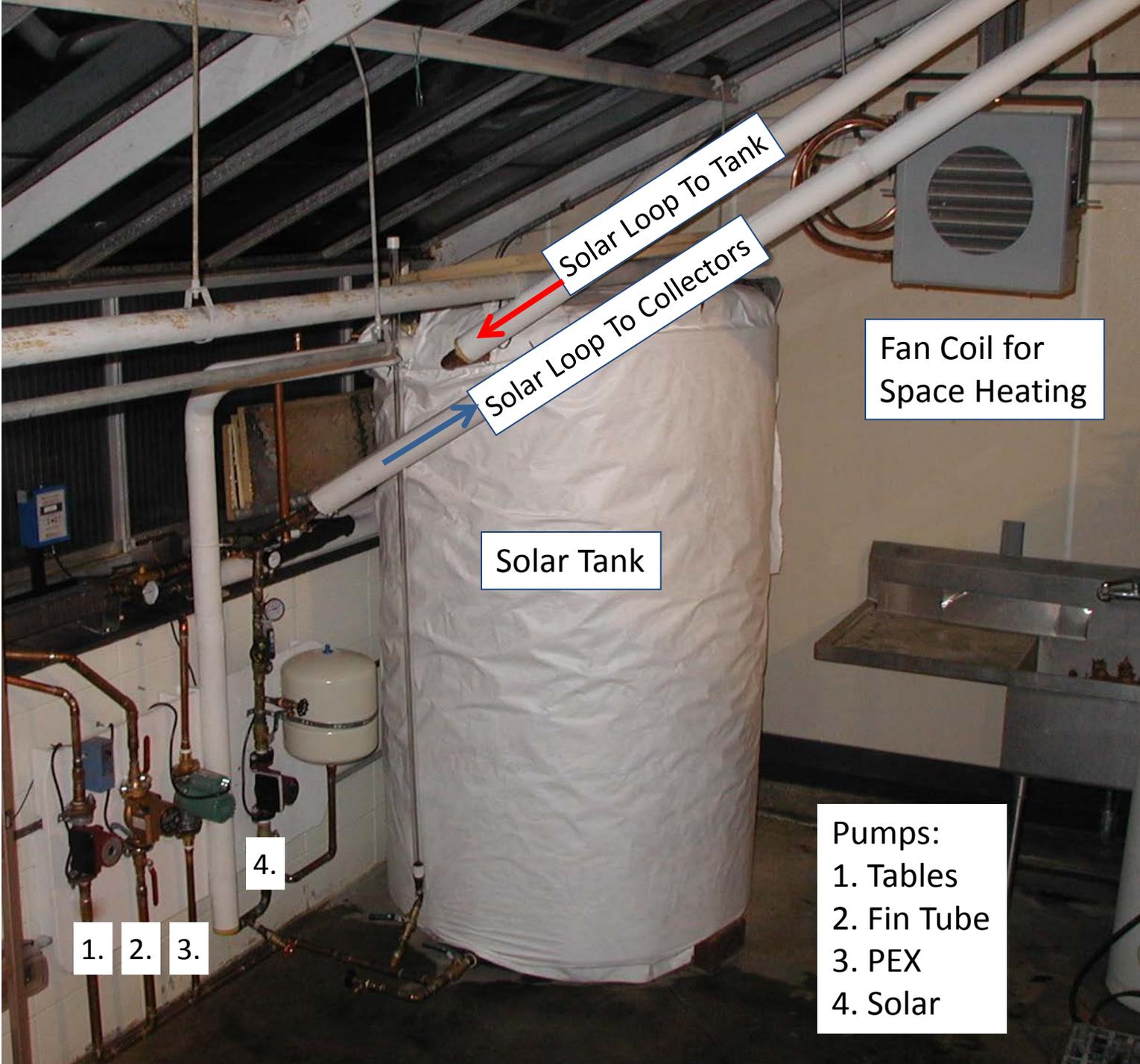
- Fin Tube Perimeter
- Radiant Tables
- PEX Perimeter
- Fan Coil



Michael Shonka assisted by MCC staff installing solar collector. Photo by Stuart Williams, MCC student. November 19, 2010.







Solar Loop To Tank

Solar Loop To Collectors

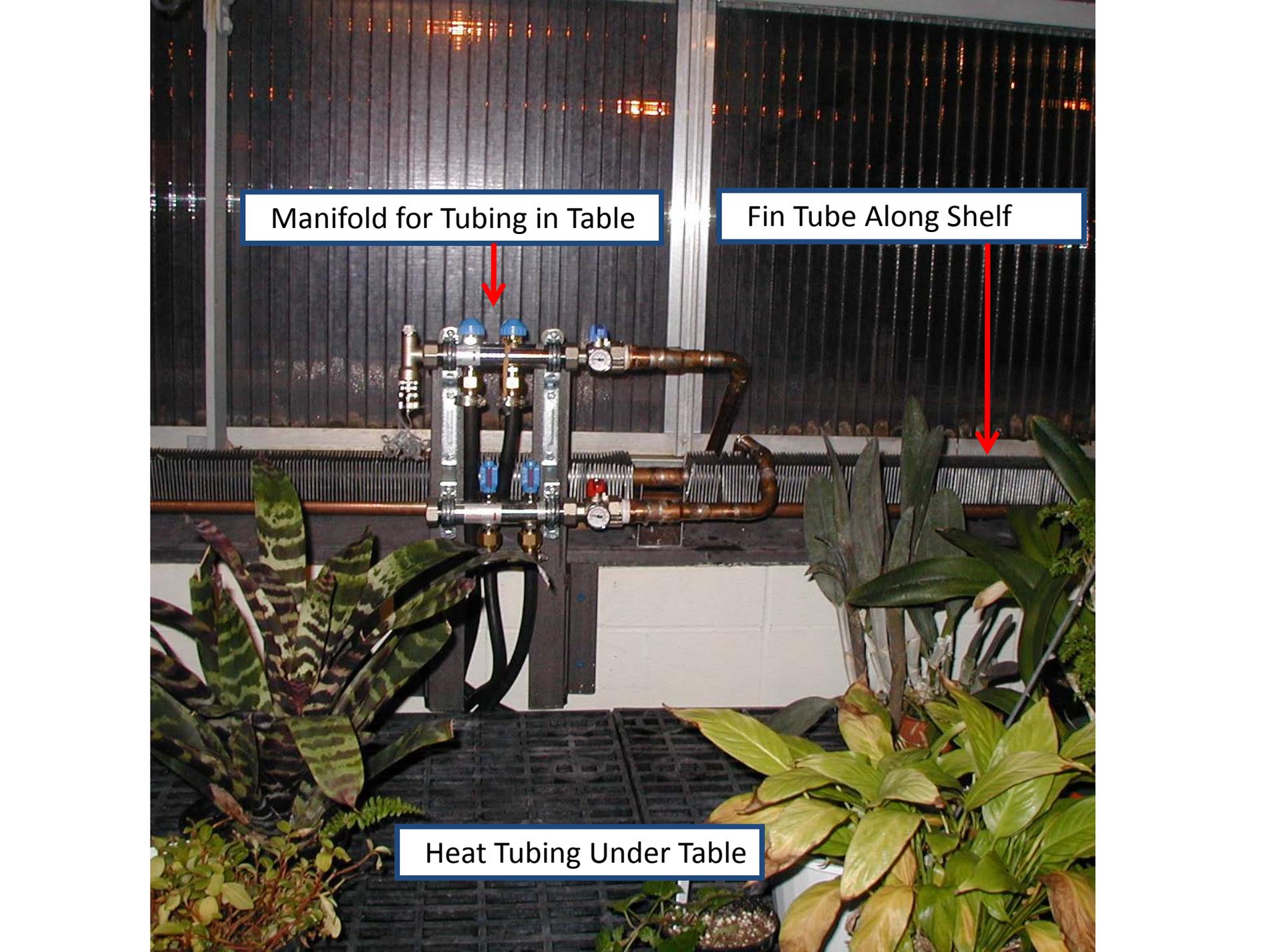
Fan Coil for Space Heating

Solar Tank

Pumps:
1. Tables
2. Fin Tube
3. PEX
4. Solar

1. 2. 3.

4.

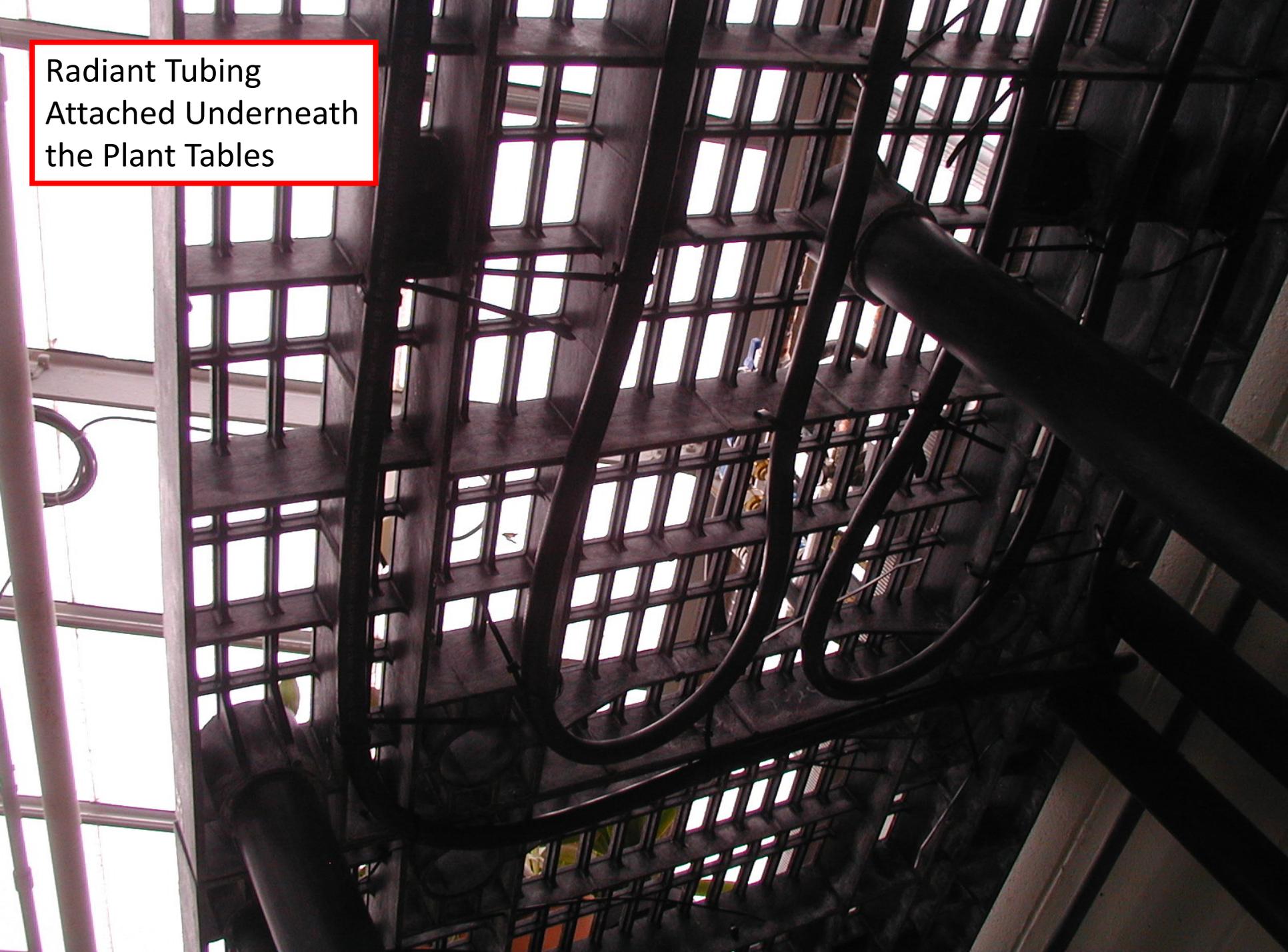
A photograph of a hydroponic system. A manifold with several blue-handled valves and gauges is mounted on a shelf. A fin tube is attached to the manifold and runs along the shelf. A heat tubing is visible under the table. The system is surrounded by various potted plants. The background is a window with vertical blinds.

Manifold for Tubing in Table

Fin Tube Along Shelf

Heat Tubing Under Table

Radiant Tubing
Attached Underneath
the Plant Tables



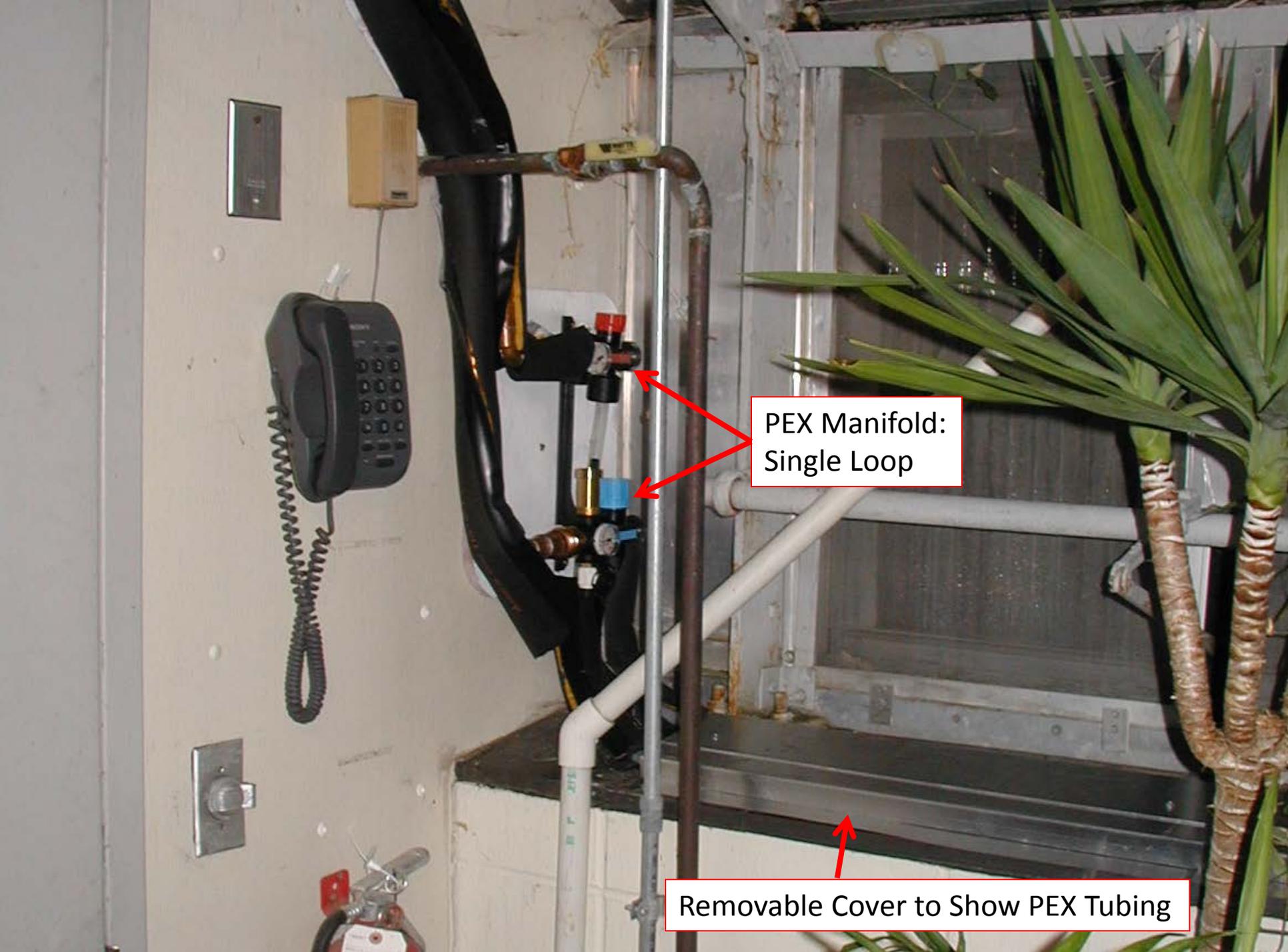
Fin Tube Along the Window Shelf





Fin Tube Along Shelf





PEX Manifold:
Single Loop

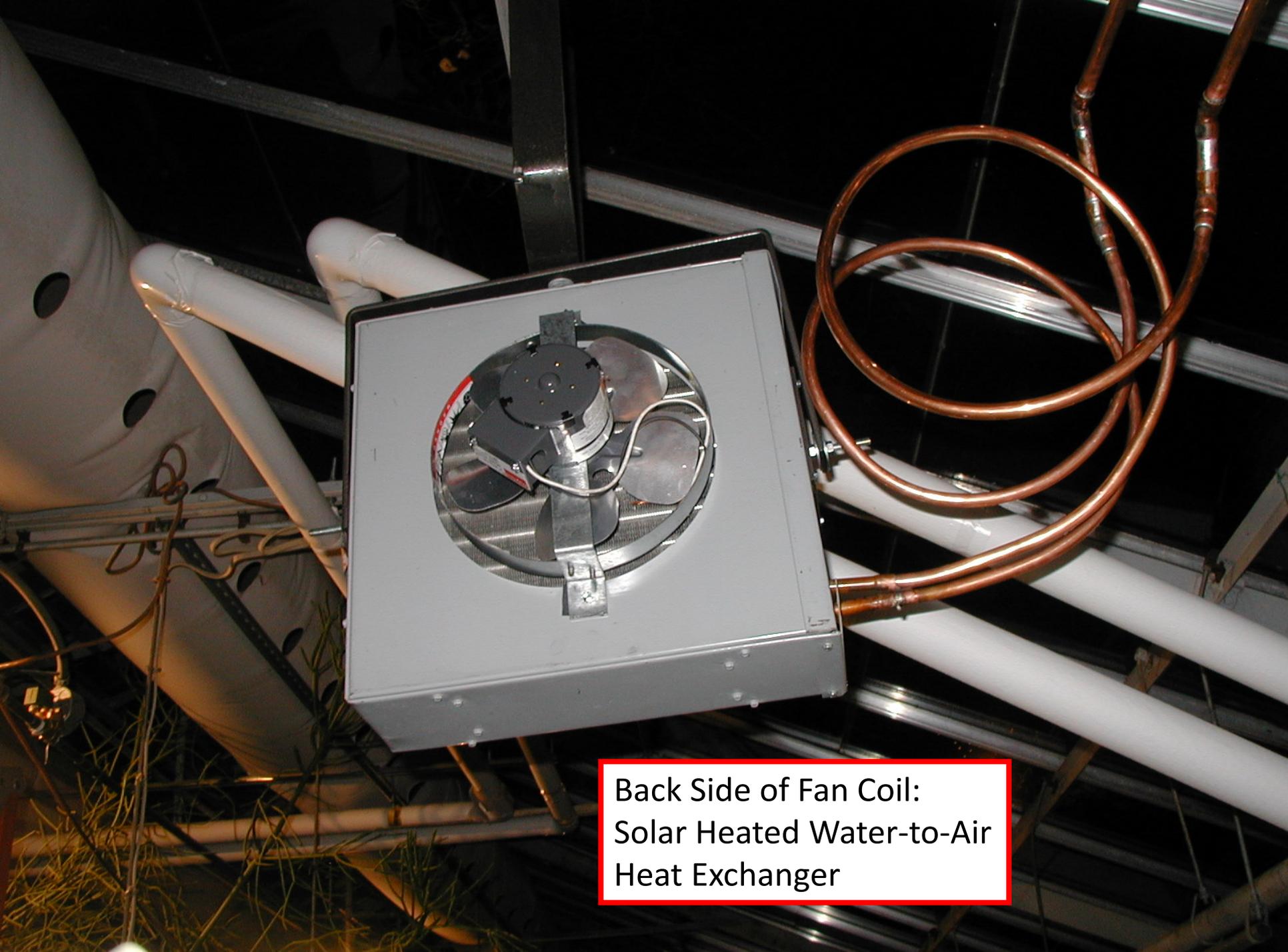
Removable Cover to Show PEX Tubing



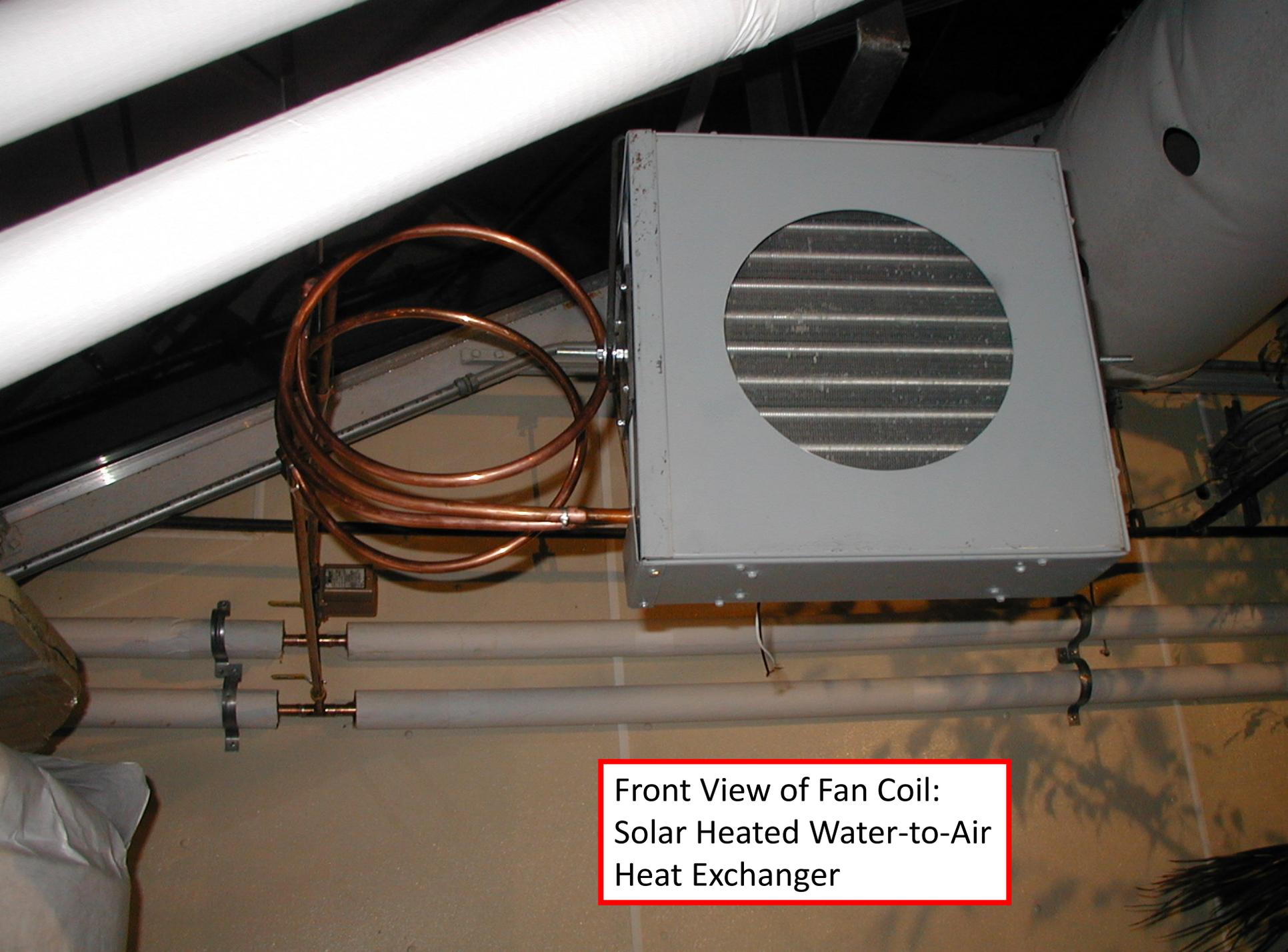
Window Shelf Before Adding PEX Tubing



Window Shelf After Adding PEX Tubing



Back Side of Fan Coil:
Solar Heated Water-to-Air
Heat Exchanger



Front View of Fan Coil:
Solar Heated Water-to-Air
Heat Exchanger



Solar Heated Greenhouse

Why is this important?

Year-around food production

Increase annual revenue for grower

Supports local business operations

Creates a cottage industry in state

Improves quality of food and life