Everybody talks about the high cost of utilities, but nobody does anything about it.

This paraphrase of Mark Twain’s famous comment on the weather may have been true at one time, but now Frank Arenas, B.S. Architectural Engineering, living in Tampa, Florida, is indeed doing something about it.

The results of Arenas’ years of research into the best methods of insulation and solar design are already paying off. In the Carrollwood section of Tampa, Arenas’ brother, in a house Arenas designed and built, is enjoying the same comfort and convenience of a climate-controlled home as his neighbors—at a much reduced cost.

“My brother’s neighbors are paying anywhere from $150 to $200 a month in electric bills for similarly-sized homes,” said Arenas, “whereas my brother typically pays about $60-$80 a month.”

Arenas emphasizes two major components of energy-efficient home building: the design of the home and the insulation used in the construction of the home.

Arenas’ own energy saving home design is comprised mainly of an air-return system that he has patented, a “floating roof” insulated with Celotex® Thermax® Insulation Board, and a stucco wall system using Celotex Thermax Quik-R™ Wall Insulation Board.

Arenas’ patented air-return system utilizes the ground the house is built on as an “energy bank.” In constructing the system, he first poured a two-inch concrete slab. After this slab hardened, bricks, which act as spacers, were evenly placed across the slab. Metal decking was then placed over the bricks, and a four-inch concrete slab was poured on top of that.

An air circulator in the closest pulls air through vents located in the floor. This air has been circulated underneath the floor of the house, between the cement slabs where it has cooled, and circulated back through the house.
Of course, keeping the interior of the house cool depends a lot on the insulation used. Arenas is sold on the process of using Celotex insulation board along with a polymer stucco exterior coating.

“I’ve used a lot of wood over foam insulation on the outside of the house,” said Arenas, “but I also needed a finish that could really take the harsh Florida sun, especially on the south wall. This is mainly where I went to the Celotex foam insulation board and Premix-Marbletite polymer stucco.”

Celotex Thermax Quik-R Wall Insulation is a glass fiber faced, polyisocyanurate foam core insulation board to which polymer stucco can be applied directly without using costly metal lath. In home construction, this board may be mechanically fastened to the wall studs, or directly to masonry.

In Arenas’ home, a stucco base developed by The Premix-Marbletite Company called “Styrocrete” was then applied directly to the insulation boards. This base consists of Portland cement, chopped fiber glass (which helps to eliminate cracks), and polymer acrylic. The company’s Super Marbletite finish coat was then applied over the base. This superior finish consists of 100% marble with an acrylic binder.

“We believe in natural, as opposed to synthetic, finishes,” said Luis Gutierrez, president of Premix-Marbletite. “The Super Marbletite finish is attractive as well as extremely durable. When applied over this special insulation board, you have a wall system that can be constructed in a minimum amount of time with a minimum amount of labor, yet gives maximum results in terms of insulating properties, longevity and durability.”

Celotex® Thermax® Quik-R Wall Insulation is specially manufactured to allow a polymer stucco to be applied directly to the board face. In the usual method of stucco application, workers must put up the board, the plywood at the corners must be covered with building paper, and metal lath must be fastened in place over the board. Stucco is then applied over the lath. The bends and general unevenness that naturally occur in the fastening of the lath can leave variations in stucco thickness from 3/8 of an inch to 1 and 1/4 inches, and results in a waste of material and unsightly “waves” along the exterior of the house.

The Celotex board is attached directly to the 2x4 wall studs or furring strips using Celotex Quik-Cap™ Washers and corrosion resistant fasteners. The washer can be pressed into the board face, which makes positioning the fasteners quick and easy.
The air-return ducts located in the lower right- and lower left-hand corners of this photo will be finished to look like standard HVAC ducts. These ducts, however, will be used to pull air from this room into Frank Arenas’ patented air cooling cement slab system located under the house, where it will then be recirculated throughout the house.

The only preparation needed before applying the polymer stucco is attaching glass fiber reinforcement mesh over the insulation board joints.

“The entire wall system has an R-value* of about 22,” said Arenas.
“The board is especially helpful in reducing labor costs, while having excellent insulation properties.”

Another energy-saving feature of Arenas’ home is his roof design. Arenas built his roof by putting the same Celotex insulation board over the trusses, then nailing furring strips in place. The plywood deck was then nailed to the furring strips, providing a 3/4-inch air space.

“The foil facing on the board in this unique roof design further adds to the insulating efficiency,” said Arenas. “The difference is like night and day. It’s obvious that in order to save energy, you want to reduce the load on your heating and air-conditioning equipment. If your attic temperature gets up to around 130 degrees, which it can do very easily in the summer, this radiates into the house and your air-conditioner has to pump it out.

“By keeping your attic as cool as possible, you’re going to reduce the amount of heat that radiates into the house, and thus reduce your air-conditioner’s load.”

Arenas’ “floating-roof” actually shades the house without transferring the heat that can otherwise build up in the home’s attic. Arenas claims the attic in a house built in this manner will usually be heated to no higher than around 80 degrees, as opposed to the high temperature that may be found
A close-up of the main entrance on the west wall of the Arenas home shows the texture of the Premix-Mabletite Super Marbletite Polymer stucco, applied directly to the insulation board. The elimination of metal lath resulted in a more uniform finish than that possible when applying stucco over metal lath, less wasted material, and reduced labor costs due to simplified application.

in the attics of traditionally designed homes, where the attic temperature can far exceed 100 degrees.

Arenas stresses that both the air space and reflective qualities of the insulation are very important considerations in this type of design.

Nobody has learned to control the weather, or energy costs for that matter, completely yet. But with innovative home designs such as that used by Frank Arenas, and state-of-the-art building materials, the effects of such outside considerations can be dramatically reduced.