

**Mercy Housing – Margot & Harold Schiff SRO** – 1244 N. Clybourn (at Division), Chicago, IL: is comprised of a five story, 96 unit, low-income residential facility run by the local affiliate of Mercy Housing, Inc. a nationwide organization. The facility has several LEEDs environmental and energy-conversion technologies in addition to the Aerotecture Aeroturbines, including:

- An advanced 48-panel solar hot water heating system designed by Solargenics, Inc. of Chicago. The panels were donated through a Chicago Dept. of Environment grant.
- A unique waste water recycling system where ‘grey water’ is reused in non-potable applications in the building and on-site
- A rain water retention and onsite controlled distribution system that limits and controls typical roof ‘runoff’ to the sewer
- A non-toxic approach to the design of building components and interior design elements
- A focus on the use of recycled and ‘recyclable’ materials in the building’s general construction within a context of making the building as ‘durable’ as possible within current construction cost constraints

On August 10, 2006, Aerotecture International, Inc. and its certified dealer/installation team, Becker Renewable Energy, Inc., assembled a group to initiate an installation that had been planned over the preceding eight months. The installation was to be the first ever designed, of its kind, for wind electric power generation on buildings, and in cities. Its goal was to demonstrate the viability of attaching specially engineered horizontal axis wind turbines (HAWTs) to the roof of a uniquely shaped building designed by Helmut Jahn AIA in order to determine the wind conversion power capability such a system might produce. The criteria for designing the system, that had just successfully completed a City of Chicago review for zoning and building permit required that:

- The completed turbines had to fall under the 70’ height limit for buildings in the area
- The turbines had to be completely safe in operation with no concerns for ‘run away’, ice throws, high vibration transfers to the building roof and with low system maintenance.
- The turbines had to be quiet in operation, with no discernable noise over “ambient”.
- The turbines had to produce power significant enough to strongly impact the power use for the 96 unit SRO and its administrative offices.
- The turbines had to be durable (10-year warrantee ) with a 30-year expected life, and be simple enough that a facility management staff could become skilled enough to take over maintenance after a one-year period of ‘optimization’ and onsite training.
- The turbines had to qualify as a LEEDs renewable energy addition and have low/no toxicity, be made with a majority of recyclable materials and be durable as compared to other exterior building materials.

Funding for the demonstration had been received from the Illinois Clean Energy Community Foundation to be administered by Robert Mathes of Linn-Mathes Construction, Inc.. The design team was led by Bil Becker of Aerotecture International (AI). The Becker Renewable Energy (BRE) engineering and installation team was led by Christian Becker. Significant contributors to the project were Michael Remke, Lisa Becker, Oliver Popadic, Timothy Rowe, James Magee, Jim Schramm, Dean Wynne,

Kurt Holtz, Robbie Harris, Jim Remke, Farrell Pelfrey and Lesleigh Lippitt. The architects, Murphy/Jahn Associates were led by Helmut Jahn and Peter Hayes. The general contractor, Linn-Mathes Construction, Inc. was led by Robert Mathes and Javier Constantino. The electrical subcontractor was Taylor Electric. Special thanks to Kurt Uhlir of Standby Power Systems of Westmont, IL who helped troubleshoot the project.

- **Mercy Housing – Margot & Harold Schiff SRO**, with its 96 units and office facilities was equipped with low-wattage fluorescent lighting, Energy Star appliances and the highest level of insulation compatible with the unique architectural design. Most of the hot water use in the facility is supported by the large solar hot water array on the roof. The ‘grey water’ from the sink and shower drains is captured for and filtered for reuse within the building’s non-potable water supplies.

By May 2007, all of the ‘first-time-ever-assembled’ Aeroturbine components for the facility had been engineered and installed using the following systems:

1. Eight (8) 520H Aeroturbines, each rated at 1500 watts in 40 mph winds – producing variable 3-phase AC power from ARE 2500 watt alternators mounted between the twin ‘rotors’ on each module. The eight turbine modules were spaced equally along the central roof axis and have their main wind access coming from the SSW. Secondary wind access is off the Lake from the NE.
2. Eight (8) Aurora 7200 Wind Interface units from Magnetek, Inc. receive the incoming variable 3-phase AC and convert it to variable DC. These same Interfaces protect the downstream inverters from high voltage ‘surges’ via a Diversion Load that is activated in very high wind conditions. It is expected that this Diversion Load will never be used due to the “self-regulation” inherent in the patented design of the Aeroturbines, making the entire installation the safest wind electric system ever installed.
3. Eight (8) Aurora 3600 watt inverters, again from Magnetek, Inc., convert the incoming DC power from the Interface units into building-compatible 208 watt – 60 hz variable amperage power that is sent directly to the building’s main panel. Most of the Aeroturbine power will be supporting lighting and refrigerator needs.

The Magnetek ‘battery-free’ electronic control systems require a period of optimization and reprogramming of their Maximum Power Point (MPPT) settings in order for the Aeroturbines to operate at the 90% power conversion efficiencies these systems facilitate. Battery based systems typically operate at power conversion efficiencies one-half that rate. The eight (8) Aeroturbines are expected to produce over 16,000 kWhs per year once they are optimized.

Low-speed winds characterize the Clybourn & Division area (4-30 mph) in this highly built-up urban neighborhood. But storm winds of over 60 mph have been recorded. The newly developed (invented in Chicago) Becker Aeroturbine has proved to be unique in meeting the need to supply sustainable and safe wind electric power within a variety of highly variable wind conditions in ways not currently available from any other wind power generating system.