Wis Tavern Building/Mauceri Project – 1825 W. Wabansia (at Honore St.), Chicago, IL: is comprised of a 3800 SF live/work space and a 1900 SF green roof and patio space sheltered by a large overhead solar array and a single 'cage' structure housing two (2) 750 watt Aeroturbine VAWTs. It is a LEED certified rehab project, and the first of its kind in the U.S. in that it employs a building-integrated wind electric system, an integrated solar electric array and a ground-source heat pump within its well-insulated and elegantly architected enclosure. The owners and general contractors are Frank & Lisa Mauceri who have rehabbed and built several buildings together. They own and operate Smog Veil Records located on the first and basement levels of the building. Among its many visually striking elements, the Mauceri's project features:

- An advanced 30-panel, 5000 watt solar electric system designed by Aerotecture International, Inc. (AI) of Chicago. The panels and their inverters were installed by Becker Renewable Energy (BRE), a certified dealer/installer for AI. The panels produce more than half of the building's daytime power and serve as an elegant overhead shade array for the recreation areas on the roof below them.
- An advanced twin rotor, 1500 watt wind electric Aeroturbine system designed by Aerotecture International, Inc. (AI) of Chicago. The Aeroturbines and their inverters were installed by Becker Renewable Energy (BRE), a certified dealer/installer for AI. They are housed in a 6' x 10' x 15' long steel tubular 'cage' designed by the project's architectural firm Wilkinson Blender Architecture of Chicago. Most of the 'cage' was welded by Iron & Wire LLC.
- A unique green roof that captures most of the flat roof's rain runoff while providing insulation and a delightful garden environment for the adjoining outdoor entertainment area. This roof garden and lounging space has been exquisitely designed by the architectural team at Wilkinson Blender.
- A whole house, twin-well, geothermal heat pump system that provides both central air conditioning and all of the heating for the live/work spaces year'round.
- A non-toxic approach to the design of building components and interior design elements plus a special emphasis on Energy Star appliances used throughout the building.
- 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

Throughout June and July, 2007, Aerotecture International, Inc. and its certified dealer/installation team, Becker Renewable Energy, Inc., assembled to assist the Mauceri's to prepare components for the installation that had been planned over the preceding eight months in consultation with Wilkinson Blender architects, Michael Wilkinson and Greg Gibson. The installation was to be the first ever designed, of its kind, for vertical axis wind turbines (VAWTs) mounted on an urban residential rooftop in an enclosed 'cage'. Its goal was to demonstrate the viability of a "super-safe" vertical axis wind turbine designed for urban use by Bil Becker in collaboration with project architects and the full installation team. Michael Wilkinson made a special effort to help change the residential zoning code for Chicago to allow for this wind generating approach, as well as others that met the safety, noise and height limits prescribed. Soon, the Aeroturbines were 'zoning approved without exceptions' for residential neighborhoods and buildings in Chicago – another 'first' for this project. Still, the criteria for designing the system, needed to successfully comply with a City of Chicago review for structural safety and building permit and required that:

- The completed turbines and 'cage' had to meet standard structural mandates required of roof-mounted auxiliary structures such as AC units, special decks and outlooks, approved signs and other additions of a similar wind load.
- Residential zoning required a 20' setback from the front building line, and a limit of 20' above the building parapet.
- The turbines had to be quiet in operation, with no discernable noise over "ambient".
- The turbines had to be completely safe in operation with no concerns for 'run away', ice throws, high vibration transfers to the building and with low system maintenance.
- The turbines had to produce enough power to strongly impact the power use for the live/work spaces.
- The turbines had to be durable (5-year warrantee) with a 30-year expected life, and be simple enough that the owners/contractors 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.

The project was funded by Frank & Lisa Mauceri who have applied for renewable energy incentives in Illinois and Chicago. 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 Lisa Becker, Michael Eviston, Timothy Rowe, Oliver Popadic, Nelson Aguilar, James Magee, Jim Schramm, Kurt Holtz, Robbie Harris and Dean Wynne. The architects, Wilkinson Blender Architecture were led by chief architect Michael Wilkinson and assistant architect Greg Gibson who also was project manager. The general contractors were the owners Frank and Lisa Mauceri. The electrical subcontractors were Title Electric led by Ron Obara and Mark Arunno; and Wito Electrical Engineering. Special welding work was done by David Green of Iron & Wire LLC of Chicago. Special thanks to Kurt Uhlir of Standby Power Systems of Westmont who helped troubleshoot all the renewables on the project.

- **Wis Tavern Building/Smog Veil Records**, with its office and recording facilities was equipped with low-wattage fluorescent lighting, Energy Star appliances and the highest level of insulation compatible with this unique architectural 'rehab' design for brick building. Most of the hot water use in the facility is supported by the geothermal heat pump. The heat pump, 'green roof', solar electric array and integrated Aeroturbines add LEEDs features shared by no other live/work facility in the U.S..

The Aeroturbine components for the facility involved the design, engineering and installation of the following systems:

1. Two 510V Aeroturbines, are each rated at 750 watts in 40 mph winds – producing variable 3-phase AC power from two SeoYoung Tech 2000 watt alternators mounted on separate 'rotors'. The vertical Aeroturbines were mounted within a 6' x 10' x 15' cage welded and bolted to the top the north stair entry roof. The 'cage' is stoutly bolted to steel supports reinforcing the entire

building. Power conduit connects the Aeroturbines to the inverters in the basement electrical room. Main wind access is from the SSW with secondary wind access from the NE. Due to the openness of the roof site, winds are moderate to strong annually.

1. Two Aurora 7200 Wind Interface units from Magnetek, Inc. receive the incoming variable 3-phase AC power and convert it to variable DC. These same Interface units 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 Aeroturbine, making the entire installation the safest residential wind electric system ever installed.
2. Two Aurora 3600 watt inverters convert the incoming DC power from the Interface units into building-compatible 240 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, refrigeration and office equipment.

The Magnetek 'battery-free' electronic control system requires a period of optimization and reprogramming of their Maximum Power Point (MPPT) settings in order for the Aeroturbine to operate a the specified 90% power conversion efficiency. Battery based systems typically operate at power conversion efficiencies one-half that rate. The Aeroturbines area expected to produce 2500 kWhs per year; the Photovoltaic array is expected to produce 5500 kWhs per year.

Moderately high winds characterize the area (10-30 mph) in this open rooftop residential area. Storm winds of over 60 mph have been recorded. The newly developed Aeroturbines have 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 worldwide.