



## GREEN PROJECT OF THE YEAR HONORABLE MENTION

# Reducing the "Carbon Tire Track"

## Roncelli Builds GM Test Lab for Electrically Powered Vehicles

By Mary E. Kremposky, Associate Editor  
Photos Courtesy of Roncelli, Inc.

At General Motor's Warren Technical Center, a renovated building with a reduced carbon footprint houses a new test lab dedicated to advancing the quality and effectiveness of electrically powered vehicles. GM's Global Battery Systems Laboratory is a "green" building constructed to aid the automotive giant in bringing vehicles with a reduced "carbon tire track" to the roadways of the world. Roncelli, Inc., Sterling

Heights, built this innovative hub, delivering an environmentally friendly building devoted to the greening of both the automotive and the construction industries.

"The Global Battery Systems Laboratory is the epitome of an Earth-friendly project," said John P. Johnson, Roncelli's senior project manager, in a written statement.

Giffels LLC/IBI Group is the architect and

engineer for this new facility that "provides a multi-channeled platform for the development of energy storage systems for electric, hybrid, plug-in, and extended range electric vehicles," said Johnson. "The facility provides General Motors with the ability to perform multiple testing scenarios that enhance its ability to bring this alternative energy technology to production on an accelerated schedule."

Testing of this alternative technology is partially powered by alternative energy, itself. Roncelli assembled and installed six AVX1000 wind turbines for use in charging and testing of battery systems. Manufactured by AeroVironment, "the wind turbines are part of a research program to determine how wind-generated power can be integrated into charging," said Johnson.

The 36,000-square-foot building saves energy and materials. "The battery charging and test systems allow for a 90 percent recovery of the electricity used to charge batteries," said Johnson. "The energy is recovered by using battery cyclers that utilize inverters to discharge the batteries. The available power is fed back through a distribution panel for power use elsewhere in the facility."

Energy savings are gained through the use of automation systems, allowing remote monitoring and control of testing equipment 24 hours a day, seven days a week. Remote or distance testing in an unlit and unoccupied lab reduces overall demand for lighting and HVAC. As a further energy savings, programmable lighting and light dimming systems, as well as energy-efficient LED lighting, is installed throughout the facility.

Insulation with a high value adds to the energy efficiency of the facility. International Cellulose K-13 insulating materials were spray-applied to the roof structure and are installed in the open grid system of the laboratory ceiling spaces, as well. The material is urea formaldehyde free, boasts a recycled content of 80 percent, boosts the acoustical performance of the facility, and reduces the ambient noise generated by the test equipment.

### REDUCE, REUSE, RECYCLE

The project team conserved material resources by constructing the laboratory within an existing facility located in the Tech Center's Alternative Energy Center. Because the project used existing infrastructure, only minor changes to existing paved areas were required to incorporate 12 outdoor stations for charging battery-powered vehicles, according to information provided by Roncelli. One key alteration was replacing existing bituminous paving with new concrete and carport structures using metal panels with a greater solar reflectance index."

By reusing an existing building, the interior masonry remained but modifications were required to relocate openings. Rather than manufacture and ship the required replacement ceramic-faced brick masonry, the project team maintained its dedication to sustainability by using a combination of recycled and reclaimed ceramic-faced brick masonry units from elsewhere

on the Tech Center campus. "As quantities of the reclaimed brick were not sufficient for the entire renovation, an existing local supply of the same size module was used and coated with a SCAQMD-compliant Zolatone product to provide a matching appearance," said Johnson.

This re-purposing campaign continued throughout the existing space. "Carpet tiles, ceiling tiles and light fixtures in areas slated for demolition were salvaged for re-use elsewhere in the facility," said Johnson. "Existing sound-rated doors and frames were re-used in new locations to fit the project's space planning requirements."

Recycled materials include Ecostone flooring, a 100 percent recycled rubber tire product installed in the main access corridors, and Interface GlasBac, a carpet tile with 47 percent recycled content installed in the new conference and media rooms.

Two other pivotal products form the ceiling and walls. Corridor and office ceilings utilized low-VOC emitting USG ceiling tiles. Sound absorption wall panels, manufactured by Industrial Acoustical Company, Troy, reduce the room reverberation, further boosting the lab's indoor environmental acoustical qualities.

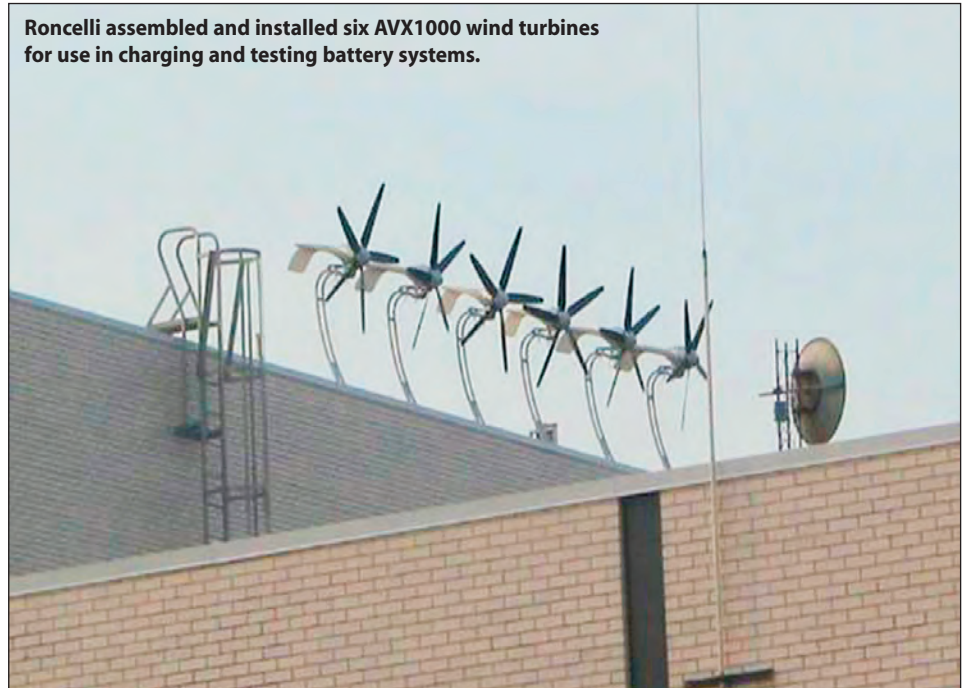
#### GREEN CONSTRUCTION

Roncelli closely guarded indoor air quality throughout the project. Johnson explains: "Demolition and the application of spray-on products can produce a significant amount of airborne particulate matter, as well as affecting both carbon monoxide and carbon dioxide levels. Air monitoring and high-level alarm systems were employed in both the construction and immediately adjacent areas to allow for the close control of operations to insure that indoor air quality standards were maintained during construction activities."

Roncelli has delivered a sustainable building that serves as a wise shepherd of energy and resources. Roncelli also was a careful steward of schedule and budget for General Motors. "By working multiple shifts and shifts during hours with less building occupancy, Roncelli, its subcontractors, and the test equipment suppliers were able to accelerate the schedule and bring the laboratory facility online and operational before the anticipated date," said Johnson.

The daily interaction of General Motors Battery Systems personnel providing architectural development and design direction, coupled with Last Planner style scheduling, facilitated completing the project under an extremely aggressive schedule. "Last Planner scheduling is a short-term scheduling management technique for production planning of construction work that is one of the philosophies of the Lean Construction Institute," explained Johnson. "Its basis is that reliable weekly plans are created to generate the maximum project benefit. The approach provides the ability to identify problems and issues in the planning stages. It is a proactive information system rather than a reactionary/recovery-based system."

The combined efforts of General Motors, Roncelli Inc., Parsons Brinkerhoff Michigan, Inc., Warren (provided owners representative services for contract administration), Giffels LLC/IBI Group, Southfield, and the trade contractors using over 56,000 man-hours to complete the project - without a recordable or lost time injury - allowed the facility to be completed four months prior to General Motor's original expectation. The savings to General Motors in outside testing costs was reported at \$6 million. Roncelli and the other participants have created an Earth-friendly, safe and cost-effective project. ☐



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