

From GM Delphi Harrison Thermal Systems to a Geothermal System

The U.S. Environmental Protection Agency (EPA) recognizes the overall benefit of siting renewable energy projects on contaminated properties. Through the RE-Powering America's Land Initiative, EPA is encouraging renewable energy development on current and formerly contaminated lands, landfills, and mine sites. This case study highlights a successful renewable energy on contaminated land (RE on CL) project, including information on how key challenges were addressed.

Heating Things Up

Located in a mixed use area in downtown Dayton, Ohio, Dayton Tech Town is now a premier technology-oriented business campus. The Creative Technology Accelerator (CTA), one of three buildings located in Tech Town and on what was the formerly contaminated GM Harrison Radiator complex, was designed as a sustainable facility that includes a geothermal heating and cooling system. The building is certified Gold in the Leadership in Energy & Environmental Design (LEED) program. LEED certification recognizes green building and best-in-class building strategies and practices; projects must satisfy prerequisites and earn points to receive LEED certification. The CTA building was awarded the Gold-level LEED certification by the U.S. Green Building Council because of its ecologically-friendly "green" features. These include the geothermal heating, ample natural lighting, energy-efficient fixtures, and a rooftop garden.

The Tech Town master plan was developed with a range of local partners and stakeholders, including the City of Dayton, Montgomery County, the Montgomery County Port Authority, the Chamber of Commerce, the University of Dayton, the Miami (OH) Conservancy District, and a number of local business and community stakeholders.

Project History

Radiator Reboot

The former General Motors (GM) Delphi Harrison Thermal Systems Facility occupied what is now the Tech Town site until 1995. The GM plant produced automotive air conditioning compressors and related components, electric refrigerators, household appliances, as well as machine guns during World War II. Various solvents, plating materials, and petroleum products were used in the facility operations, and there are documented incidents of spills that occurred during the facility's years of operation.



Tech Town Campus - Photo courtesy of City Wide Development

DAYTON TECH TOWN AT A GLANCE

- Dayton, Ohio (<http://daytontechtown.com/>)
- Former GM Delphi Harrison Thermal Systems Facility property.
- Former GM plant is 40 acres, Tech Town Campus occupies 24 acres.
- The Creative Technology Accelerator is a 42,000 ft² building utilizing geothermal heating and cooling
- Expected annual savings for development are over \$66,000 and 300,000 kilowatt-hours/year related to sustainable building and geothermal system.
- Site remediated under the Ohio EPA Voluntary Action Program.
- Property Owner: CityWide Development Corporation

"In Dayton, urban revitalization means building our technology-based future from our industrial history, Tech Town is a contemporary example of environmental responsibility and revitalization."

—Nan Whaley, Mayor of Dayton

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The former GM plant property occupies 40 acres. Remediation status varies across the site, with some portions complete, some currently under remediation, and some requiring future remediation. CityWide Development, which owns the site, intends to eventually remediate the entire property.

The city leveraged local resources and developed partnerships with state and federal agencies. The city received \$6 million from the Clean Ohio Fund for remediation and demolition, \$2.9 million through the U.S. Army Corps of Engineers for water and sewer infrastructure upgrades, and \$375,000 in environmental assessment [resources from EPA](#). In addition, the state of Ohio recovered more than \$5 million from GM during the company's bankruptcy proceedings for remediation at the site. Dayton also obtained federal and state assistance to construct the initial buildings in the Tech Town campus; a \$2.5 million U.S. Economic Development Administration grant and \$2.8 million in loans was used to construct the CTA. Tech Town also received \$5 million in grants from the State of Ohio for construction costs and New Markets Tax Credit for construction of Building 3.

In 2000, the Entrepreneurs Center, the first building of Tech Town opened. After the completion of this building, demolition and remediation was needed to prepare the site for additional development. Construction for the CTA began in 2008 and was completed in 2009; and Building 3 was completed in 2011. With public interest increasing in both Tech Town and sustainable development in general, Tech Town is working to attract developers who might be interested in building on available sites at the campus. The goal is to eventually construct seven to 10 additional buildings with 400,000 square feet of office and manufacturing space creating 2,500 jobs while leveraging the benefits and availability of geothermal.



Former Frigidaire Plant

In addition to the geothermal system, the property owner used the following principles for Sustainable Design in designing Tech Town:

- City-Wide and Regional Connections
- Transit System Connections
- Neighborhood Form
- Design for the Human Scale
- Mixed-Use
- Street Network
- Public Open Space
- Architectural Character
- Safety and Civic Engagement

Community Sustainability

The collaborative Master Plan developed for Tech Town called for the site to be a 'sustainable development.' The geothermal installation was included in the building engineering and design. A LEED qualified engineering firm was required by the design team Request for Proposal.

Brownfield redevelopment is a key component of the City's economic development plan and the overall strategic plan. Tech Town's success is due in part to the redevelopment being a priority at the city, county and regional levels.

Development Concurrent with Remediation

As mentioned, remediation at the former GM Delphi Harrison Thermal Systems Facility is in various stages as of 2014. The site is being addressed under an agreement between the Ohio EPA [Voluntary Action Program](#) (VAP) and U.S. EPA's [RCRA Corrective Action Program](#). Under Ohio EPA VAP, site owners who wish to remediate a property are provided guidance on specific Ohio EPA standards for doing so. When remediation requirements are met, Ohio EPA issues a covenant not to sue for additional investigation or remediation.

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Remediation in the renewable energy project area at Tech Town was completed concurrent with site development and did not significantly affect the development timeline. Remediation included a soil removal action that was completed during site preparations. Plans for redevelopment were submitted to Ohio EPA prior to construction of the RE project. Ohio EPA and U.S. EPA provided comfort letters, which were received prior to construction.

The geothermal well is located on a portion of the property for which remediation is complete. The site is being restricted to commercial or industrial land use, and use of groundwater from beneath the property is restricted. Assessment results were provided to U.S. EPA as part of work conducted under the voluntary agreement between Ohio EPA and U.S. EPA RCRA Corrective Action program. In accordance with the restrictions placed on the site, the well that services the geothermal heating and cooling system was double-cased through the contaminated upper aquifer, screening the uncontaminated lower aquifer only. This prevents any draw-down of contamination from the upper aquifer into the lower aquifer and allows extraction of groundwater from the cleaner deeper unit. Discharge from the geothermal system is regulated under a [National Pollutant Discharge Elimination System](#) permit with regular monitoring and reporting.

Success

Overall, Tech Town and the CTA's geothermal installation were successful because of close working relationships between the developer and multiple local, state, and federal agencies. No special partnership agreements were required for the geothermal component of the project. As of March 2015, the CTA is fully occupied.

For More Information

For more information about the RE-Powering America Initiative and tips on developing RE on CL, visit [EPA's website](#).



*Construction of Creative Technology Accelerator Building
Courtesy CityWide Development*



*Aerial View of Tech Town Campus and River
Courtesy CityWide Development*

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Key Takeaways from Project Participants

- *Develop a 'master plan' that involves stakeholders early during the process. Work with stakeholders to create guidelines and principles that support the concepts envisioned for development of the site.*
- *Having brownfield redevelopment as a key component of the local economic development plan and the overall strategic plan can bolster projects on contaminated sites. Tech Town's success is at least in part due to redevelopment being a priority for the city, county and region.*
- *Development of this site occurred concurrent with remediation. Tech Town provided plans to Ohio EPA ahead of time and worked with them to ensure that development would not affect remediation, and that development of a geothermal well would not violate the restrictions placed on the site. This communication allowed the project and remediation to proceed together and on schedule.*