Making Sustainability Relevant through Exploration of Land Reuse Options: The Oak Ridge Energy Corridor Example – 11328

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ABSTRACT

Between 2007 and 2015, the U.S. Department of Energy (DOE) Office of Environmental Management (EM) footprint will be reduced by approximately 800 square miles. As the EM footprint is reduced, land and other valuable site assets, such as buildings and infrastructure, may become available for future beneficial uses. This presents an opportunity for DOE to work with local and regional communities and other interested stakeholders to develop viable, self-sustaining futures for these areas. Several local communities are developing a range of "reuse" concepts for cleaned-up former nuclear defense sites, which may include as an option the establishment of energy parks for the sites and/or surrounding areas. This paper describes the general concept of energy parks and discusses the concept being developed for a regional Oak Ridge Energy Corridor (OREC) in Oak Ridge, Tennessee.

INTRODUCTION

The DOE EM has made a major commitment to cleaning up former nuclear defense sites in a safe and expeditious manner. Much progress has been made over the last several years, and the Department has plans for completing many site remediations within the next 5 years. For example, the DOE-EM goal for the Savannah River Site is to reduce the 2007 footprint of 263 square miles to 31 square miles by 2015. Similar reduction goals for the Hanford Site reduce the footprint from 586 square miles to 75 square miles within this same time frame.

Historically, cleanup efforts have been an integral component that has contributed to the stability of local communities and local economies that are located near former nuclear defense sites. As the Department completes more site remediations, local communities and governments have been looking for new ways to diversify their economies. Many communities are considering incorporating regional energy parks concepts in their potential reuse plans. Revitalization of the DOE assets, including transition of these sites for beneficial use, plays a significant role in helping diversify these regional economies as cleanup work is completed. While the Department does not currently have an energy parks program, it is poised to reevaluate human and physical assets at these sites and work closely with local communities to identify appropriate opportunities for a sustainable future.

This paper describes a potential land reuse scenario involving the energy parks concept and discusses potential opportunities under consideration for development of the Oak Ridge Reservation (ORR) and surrounding area in east Tennessee.

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ENERGY PARKS CONCEPT

The DOE-EM efforts for footprint reduction over the next 5 years may allow many assets from former nuclear defense sites to become available for future beneficial uses. Potential assets that DOE could consider making available include land; infrastructure such as equipment, structures, roads, rail lines, and electricity transmission facilities; natural resources; energy resources; site environmental characterization data; technology; highly trained and experienced workers; and incentives such as loan guarantees, purchase agreements, tax credits, etc.

Communities in the vicinity of a number of DOE sites are considering economic redevelopment concepts that may include deploying a range of energy technologies on the DOE sites and/or surrounding areas. These energy technologies include generation (e.g., solar, wind, biomass, geothermal, nuclear, clean fossil, hydrogen generation), distribution (e.g., smart grid), storage, efficient utilization, and related advanced manufacturing (e.g., solar panels, wind turbines, other energy components). The development phases envisioned range from commercial deployment using existing technologies to research, development, and demonstration of advanced technologies to facilitate deployment and replication across the nation. As the communities develop concepts that involve utilization of DOE lands that are being cleaned up, the concepts will be presented to DOE for consideration for future land reuse options.

The DOE Oak Ridge Office (ORO) has historically been one of the more successful sites at reusing or reindustrializing DOE land for a variety of beneficial uses. Recently, local planning organizations have developed an energy-based focus for the region that brings together public and private organizations to form partnerships for energy enterprises and could include reuse options for portions of the ORR. This concept will be discussed in more detail below as a potential example of how an energy park could be implemented.

THE OAK RIDGE ENERGY CORRIDOR

The OREC is a regional concept for deployment of energy-related research, technologies, and demonstrations. It is located within the Tennessee Valley region, with a strategic focus on the regional triangle that surrounds and includes the cities of Oak Ridge, Knoxville, and Maryville as shown in Figure 1. The “Energy Corridor” is formed as a result of the close proximity of the DOE facilities in Oak Ridge (shown in the upper left-hand corner of Figure 1), the headquarters of the Tennessee Valley Authority (TVA), and the University of Tennessee (shown in the upper right-hand corner of Figure 1), along with hundreds of technology-based businesses. The initial focus of the OREC is to develop areas along the Pellissippi Parkway, which connects the cities of Oak Ridge, Knoxville, and Maryville. The OREC provides an energy-based focus for the region and serves as an economic catalyst, strengthening the ability of the existing economic development organizations to attract and retain companies committed to energy-related issues.

The goal of the OREC is to lead, promote, encourage, and support a sustainable energy plan for the ORR and the regional corridor with the ultimate goal of creating a sustainable regional energy park by focusing on fundamental energy initiatives such as energy generation, transportation, efficient use, distribution, storage, and manufacturing. The strategic objectives are to support development, demonstration, and commercialization of solutions to the country’s

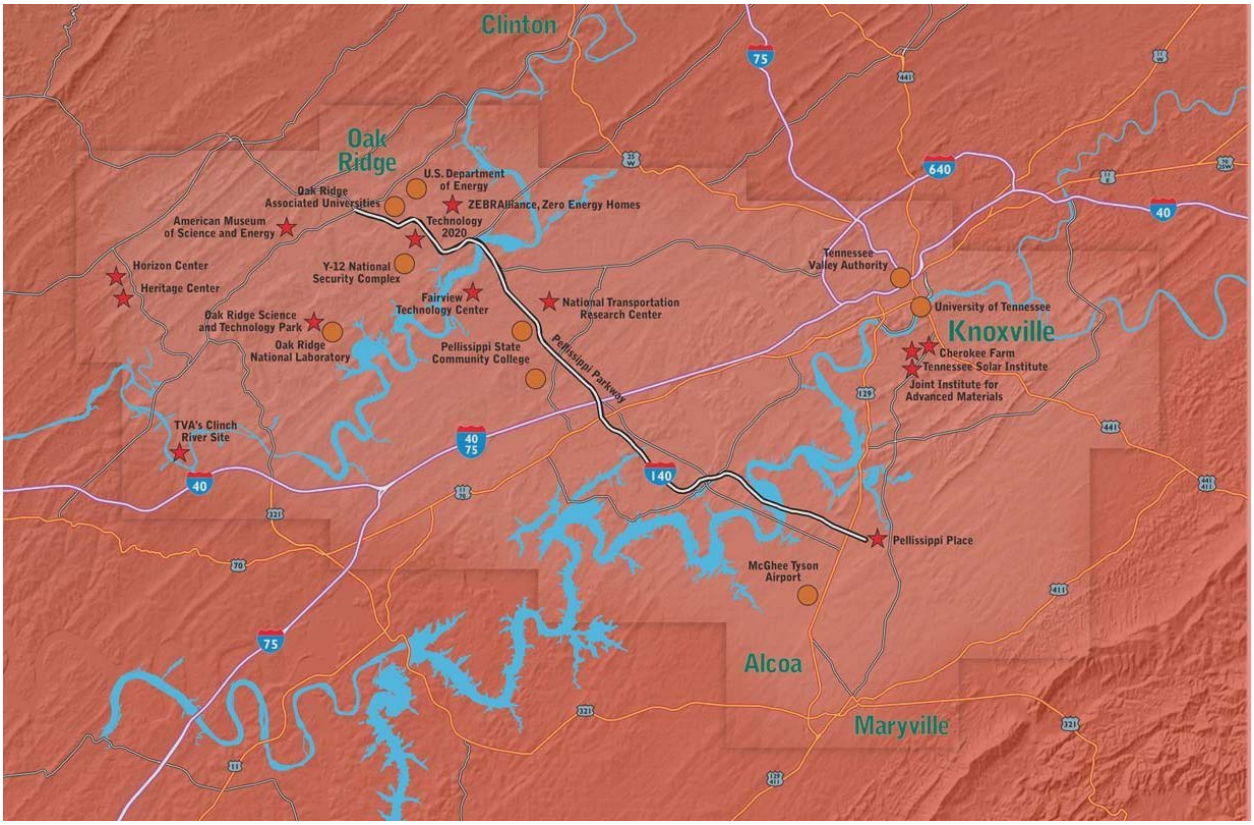

Fig. 1. The Oak Ridge Energy Corridor.

energy challenges, assist area local governments and economic development organizations in attracting energy-related businesses to the Corridor, and coordinate activities and programs that support existing U.S. energy missions and help bring new missions to the state and federal organizations in the Corridor. The implementation concept for the OREC is to build upon the previous successful experience with reindustrialization of cleaned-up DOE land and to utilize the vast network of industrial and science and technology parks in the region to attract energy-related businesses.

The DOE ORO Reindustrialization Program [1, 2, 3] started in 1996 as a method to accelerate cleanup of the former K-25 Gaseous Diffusion Plant. Its initial mission was to transition assets at the site, such as buildings and equipment, to the private sector for commercial use. Private companies leasing space at the site paid for maintenance of the leased facilities as well as utilities. This resulted in a savings to DOE that could be used for cleanup. In addition, this program helped to stimulate economic development in the region which helped to offset DOE downsizing. The Office of Nuclear Fuel Supply leads Oak Ridge's reindustrialization effort. The Program's current goal is to transition the East Tennessee Technology Park Heritage Center (the former K-25 Gaseous Diffusion Plant) into a self-sustaining industrial/business complex. The Community Reuse Organization of East Tennessee (CROET) is DOE's partner in this endeavor and is responsible for commercial development of this site as well as for other economic development initiatives on the ORR and in the region.

The reindustrialization program is essentially an innovative approach to brownfield redevelopment with the unique feature of assets being transitioned to the private sector while cleanup of the site is underway. In addition to leasing underutilized facilities, initial reindustrialization efforts also included entering into barter arrangements with private companies that allowed for the exchange of equipment and/or materials for cleanup. Companies leasing space could decontaminate facilities at the site for reduced lease rates in a unique application of "sweat equity." DOE-ORO has also used nontraditional contract strategies to fund cleanup of facilities for future use, often trading the value of assets in the buildings for cleanup services. At the height of the leasing program in 2002, approximately 90 leases were in place with 40 companies, providing 400 private-sector jobs.

The next step occurred in 2003, when DOE-EM introduced its Accelerated Cleanup Plan, and the Code of Federal Regulations, 10 CFR 770 [4], was promulgated. Under the Accelerated Cleanup Plan, the former K-25 Site received additional funds in order to speed up cleanup. This created a problem for some of the private companies that were leasing space at the site because they were occupying buildings that were slated to be demolished sooner than expected. In order to address this problem, the decision was made to refocus the mission of the program to establish a self-sustaining private sector industrial/business park by transferring title of properties at the site rather than continuing to lease properties. Transfer was the logical next step, and 10 CFR 770 provided DOE with the tool that was needed to allow this to happen. The 10 CFR 770 regulation allows for transfer of property at less than fair market value, and it allows DOE to extend indemnification. Both of these features are extremely important to the private sector, especially if they are going to make a sizable investment in the property.

To date nine former DOE office and manufacturing buildings totaling more than 300,000 square feet have been transferred to CROET, and five of these have been sold to a private developer. Land parcels, totaling ~160 acres, have been transferred to CROET for new construction, and transfer of over 250 acres is currently under way. These assets are now available for all types of industry, including heavy manufacturing, machining, and component fabrication, as well as office and laboratory space. Current tenants include businesses performing recycling and environmental cleanup work, medical filtration design, transportation and logistics services, manufacturing, chemical laboratories, tool and die shops, waste management services, and electronics production. DOE has also transferred much of the infrastructure at the site including its fire station, water treatment plant, and much of the water and sewer systems, the electrical distribution system, and roadways to the City of Oak Ridge. Establishing a private sector park that receives its utilities from the local municipality is an integral component of success.

Reindustrialization of the Heritage Center is a first-of-its-kind endeavor where DOE is transferring assets that are no longer needed to the private sector for economic development while environmental cleanup of the site is ongoing. With no preexisting roadmap to follow, the reindustrialization team created a program that has proven to be a model for federal/private partnerships. The program has been recognized as "best in class" and has been awarded the U.S. Environmental Protection Agency's (EPA) prestigious Phoenix Award for Excellence in Brownfield Redevelopment. In addition, the program was a finalist in this year's U.S. General Services Administration's Annual Achievement Award for Real Property Innovation in the asset management category.

A key element to the success of the reindustrialization program is the relationship between the program's partners—DOE-ORO, CROET, the City of Oak Ridge, the State of Tennessee, and EPA. Prior to DOE-ORO leasing or transferring underutilized assets to CROET, they worked with local, state and federal agencies to obtain the necessary approvals. CROET is now responsible for the commercial development of these assets and subleases and/or transfers them to interested businesses. In addition, Bechtel Jacobs Company, a DOE-ORO prime contractor, provides technical support throughout the process. This partnership is unique in that the parties have found a way to work together as a team to accomplish a common mission, even though they sometimes having differing goals.

The establishment of the Heritage Center industrial business park is part of a larger concept established by DOE-ORO and the community for utilization of local assets. As the former K-25 Site is cleaned up, DOE-ORO envisions that up to 1,800 acres of land may be made available for the industrial business park using the same mechanisms established for previous land transfers and leases. Adjacent to the Heritage Center is the Horizon Center, a green field site that is intended to be utilized for mixed uses. In 2003, DOE ORO was the first DOE site to use 10 CFR 770 to transfer approximately 500 acres of developable property to CROET; and recently, CROET transferred the property to the City of Oak Ridge. The City's Industrial Development Board is selling parcels of land for development. Currently, there are two facilities operating at the site, and three more parcels have been sold. Also, a Science and Technology Park has been established at the Oak Ridge National Laboratory (ORNL) on land provided by DOE to establish the nation's first technology park on the campus of a national laboratory. Initially, 12 acres of land have been leased to CROET for development (and potentially up to 40 acres will be made available as clean up progresses). The first new facility has been constructed, and an existing building is being leased to private sector companies in order to support the Laboratory's technology transfer mission. The idea is to allow the private sector an opportunity to locate at ORNL so that they can collaborate with scientists to bring technologies from the research and development stage to the point that they can be manufactured or fully utilized. The remainder of the ORR is planned for continued DOE use, conservation, and recreational uses. Adjacent to the ORO is the Clinch River Site which is owned by TVA and is being considered for power generation uses.

As mentioned previously, the OREC concept builds on the experience base of the Oak Ridge reindustrialization program and the DOE-ORO vision for the reservation and expands it to a regional program. Projects will support the national agenda of improving energy generation, security, transmission, and storage, as well as transportation innovation. All projects considered for implementation by OREC will take into account economic, social (stakeholder buy-in), and environmental aspects for energy sustainability. The OREC concept brings all three of those aspects together so that projects with the potential to have a real impact on energy security can be implemented. The vision for the Corridor involves leveraging DOE-related assets that are available through ORNL, the Y-12 National Security Complex, and Oak Ridge Associated Universities, as well as through other partners, including but not limited to CROET, TVA, and the City of Oak Ridge, to achieve these objectives. Partnerships that can leverage investments from local, state, and federal agencies and the private sector for projects within this scope are being sought.

Projects presently under consideration by OREC include the following:

- A regional transportation initiative to demonstrate energy efficiency and conservation; clean transportation; and alternate fuel use, storage, and production technologies
- A large-scale solar project integrating combined cycle power generation with a solar concentrator on a capped waste site
- A modular power reactor deployment demonstration on TVA's Clinch River Site
- Educational and outreach projects combining the cluster of LEED-certified buildings; the American Museum of Science and Energy; Oak Ridge Associated Universities' "Classroom of the Future"; and the Oak Ridge City Center, with a renovated library, city facilities, and retail sector
- An isolated power distribution system to provide a baseline for integrated power flow control, technology prove-in, baseline information for models and advanced simulation, and integration of various aspects of a distributed energy generation and storage system

Proposals are being submitted to various funding agencies, such as the Department of Transportation, for each of the above projects, and partnerships are being sought with relevant private-sector companies for each proposal. The model that was successfully used to develop and implement partnerships under the reindustrialization program will also be utilized for the OREC. Consideration for siting projects on the ORR will initially focus on former DOE land that has already been approved for lease or transferred to CROET for industrial development. Any additional DOE land considered for use by the OREC will be proposed to DOE using established mechanisms.

Continuing this approach, OREC seeks to make the ORR net carbon neutral by 2030 with an integrated clean energy power project. The first step would be to install a 140 megawatt small modular nuclear reactor, a 10 megawatt solar thermal hybrid gas turbine, and 10 megawatt distributed solar photovoltaic equipment to increase clean energy generation from 26% to 56% by 2020. Expanded use of these modular technologies coupled with electric, hybrid, or alternatively fueled vehicle transportation and energy efficiency projects could make Oak Ridge the first carbon neutral retrofitted city in the United States and improve the per capita energy efficiency within the Corridor by 30%.

SUMMARY

Between 2007 and 2015, the DOE EM footprint will be reduced by approximately 800 square miles. As the EM footprint is reduced, large areas of land and other valuable site assets may become available for future beneficial uses. This presents an opportunity for DOE to work with the private sector, local and regional communities, and other interested stakeholders to develop viable, self-sustaining futures for these areas. Future use options may include the development and deployment of energy and related advanced manufacturing technologies that could also set a national example for implementing these technologies and create a business environment that encourages collaboration and interaction between the public and private sectors. Lessons learned from the Oak Ridge reindustrialization program and OREC that may potentially utilize some of the cleaned-up DOE land for energy-focused initiatives may be beneficial to other communities surrounding DOE sites as they develop future economic and reuse plans.

REFERENCES

1. "Tennessee Valley Energy Enterprise," presented at the Energy Communities Alliance Meeting, April 23, 2009, http://www.energyca.org/PDF/TVA.pdf.
2. "East Tennessee Technology Park," http://www.ettpreuse.com.
3. "EPA Region 4—Oak Ridge East Tennessee Technology Park Reindustrialization Program, Oak Ridge, Tennessee," http://www.brownfields.com/Feature/Feature-Awards2003-region4.htm.
4. 10 CFR 770, Code of Federal Regulations, Title 10, Volume 4, revised as of January 1, 2002, U.S. Government Printing Office.