

**Ohio University (OU) Voinovich School of Leadership and
Public Affairs US Department of Energy Office of
Environmental Management
(DOE EM) Financial Assistance Grant**

**Collaborative Efforts to Inform DOE EM Cleanup, End
State Configuration and Accelerated Property Transfer at
the PORTS facility in Piketon, Ohio**

**Site Repurposing Continuation and Ongoing
Technical Assistance, Public Outreach, Education,
and Engagement for Property Transfer and Future
Use**

Grant Year 4 (GY4) April 1, 2019 – March 31, 2020

Combined Activities Report

**Stephanie Howe
Ohio University (OU) Voinovich School of Leadership and
Public Affairs**

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Department of Energy Office of Environmental Management
Portsmouth/Paducah Project Office*

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Purpose and approach

The Site Repurposing Continuation and Ongoing Technical Assistance, Public Outreach, Education, and Engagement for Property Transfer and Future Use activities serve the DOE EM cleanup mission in several ways. These activities expand data utilization with site stakeholders at PORTS and in the region to enhance information-based decision making when determining viable future-use options for the site and site assets, so that cost savings/cost avoidance may be realized by DOE as cleanup efforts continue. These activities contribute to informing the end-state configuration for the site and may expedite property transfer for reindustrialization, thus supporting DOE's efforts to reduce the EM footprint at PORTS. Additionally, grant activities support the site reindustrialization efforts being led by the local community reuse organization, the Southern Ohio Diversification Initiative (SODI).

Ohio University's role in the site repurposing and ongoing outreach activities is to serve the public interest: by acting as an independent, credentialed broker of data and other information; by convening, facilitating, and assisting collaborative partners and interested parties--including government, business, and community entities-with information sharing and partnership building; by brokering relationships with private sector entities who are potential future tenants; and, along with collaborators, by employing data-driven decision processes to ensure efficacious planning for site future-use endeavors. These efforts are responsive to the stated future-use preferences of the public at large in the four county region near the site as identified during various DOE and Ohio University public engagement efforts.

All site repurposing and ongoing outreach activities were carried out in the form of a collaborative effort among Ohio University (OU), DOE, the local community reuse organization known as the Southern Ohio Diversification Initiative (SODI), site contractors, and national experts. As the activities were carried out, progress updates and/or conversations were held with stakeholders such as the Site Specific Advisory Board (SSAB), local, state, and federal elected officials; county, regional, and state-level economic development professionals; private sector interests; national experts; and/or the public at large.

The work is part of the Ohio University PORTSfuture Program that focuses activities in the areas of public engagement, training, outreach, and STEM education; ecology, hydrology, site environment field work; site readiness, GIS, and data analysis; economic modeling/economic impact analysis; industry discovery; and partnership building. All grant activities create public value and serve the public interest in one or more of the following ways: informing site cleanup and future use planning; cost savings/cost

avoidance for cleanup; facilitating the transfer of property to reduce the DOE EM footprint; leveraging public assets of the PORTS site and the region to create regional economic stability; and providing regional youth with STEM education opportunities related to the site and/or emerging STEM-related occupations.

Background

The U.S. Department of Energy's former Portsmouth Gaseous Diffusion Plant (PORTS) near Piketon, Ohio has been an important economic player in the Pike, Scioto, Ross, and Jackson County region for many decades. This fact has impacted the region's socio-economic profile. As the decommissioning and decontamination process continues at the PORTS site, it is expected that this transition period will lead to further changes in the region's socio-economic profile including the creation of socio-economic stressors as well as growth opportunities. The extent to which decision-makers can minimize transitional stress and maximize the economic prospects for the region hinges greatly upon the cleanup and transfer of the PORTS site and site assets for other economic use.

Leveraging foundational public engagement activities

Site repurposing continuation and Ongoing Technical Assistance, Public Outreach, Education, and Engagement for Property Transfer and Future Use activities build upon site repurposing and outreach activities conducted with 3161 funding during 2013-2015 and previous work under grant years 1, 2 and 3. These activities also build upon findings from Ohio University's original DOE grant work under the public outreach task completed in 2011. Under the outreach task, Ohio University conducted a 15 month, broad-based, grass roots, public participation process in Pike, Scioto, Ross, and Jackson Counties to identify the community's future-use preferences for PORTS. Community participants in outreach activities included residents, economic development entities, environmental groups, nonprofits, businesses, governmental interests, and many other stakeholders in the four counties near the PORTS reservation.

To inform the design of the outreach project, OU conducted qualitative research that included interviewing key site stakeholders, conducting four focus groups with the public at large, and administering a regional telephone survey in order to gain information about residents' opinions on major problems facing local communities, their awareness/knowledge of the site and current cleanup efforts, and their preferences for possible site future uses. Results from this qualitative research were used to design Community Visioning Teams that further broadened opportunities for public involvement at a more in-depth and focused level. Future-use scenarios were developed by community participants in County Visioning Teams and voted on by the public at large at numerous public events and online. County Visioning Teams were provided summary findings from the qualitative research, data on the site and site assets, cleanup plans, and reports that detailed environmental conditions on the site. Throughout the visioning process, participants reviewed and discussed the data and used this input in creating their future use scenarios. The link to the full outreach report is at the bottom of the resulting screen at this webpage: <http://www.portsfuture.com/Default.aspx>

Public voting on future use preferences occurred online and in-person at public events throughout the region from July 15, 2011-September 30, 2011. A total of 1,141 people voted on the nine scenarios. Each person could select 1-3 scenarios as preferred options for future use consideration for PORTS. Results of the multiple choice voting, with the top four scenarios highlighted in red font, are as follows:

<u>Scenario Name</u>	<u>Total Votes</u>
Nuclear power plant	495
Green energy production	475
Industrial park	421
National research and development	418

Warehousing, distribution, and transportation hub	179
Training and education facility	160
Metal recovery facility	152
Multi-use southern Ohio education center	143
Greenbelt	131

Scenario preferences obtained through the public voting activities were reported to site stakeholders and the final outreach task report was submitted to the U.S. Department of Energy, Office of Environmental Management, Portsmouth/Paducah Project Office, DOE PORTS site officials, and the PORTS-SSAB for their consideration in informing cleanup and risk reduction decisions. These results served to inform all site repurposing activities.

Site repurposing activities-history and evolution prior to current grant year

2013-2015

Staff from OU, SODI, DOE and relevant site contractors met regularly and engaged in activities to achieve the collaborative goals of informing DOE EM cleanup, end-state configuration and accelerated property transfer at PORTS. Efforts focused on identifying viable options for best leveraging the site and site assets and identifying related industrial sectors that could be recruited as future tenants of a reindustrialized PORTS reservation. The Energy Sector was vetted in-depth and the potential to attract energy-related businesses to locate at the site appears to be favorable. Due to southern Ohio's long-standing ties to energy industries, the ability to develop/strengthen an energy cluster in the region will be enhanced with the site cleanup, transfer, and reuse. During 2014, the President and CEO of the International Economic Development Council (IEDC) met with the collaborative group to discuss strategies for site reindustrialization in the top three identified potential future use sectors that include energy, advance manufacturing, and transportation/logistics. The IEDC President in his role as an OU Voinovich School Senior Fellow continues to provide expert input and guidance to grant activities throughout the year as requested and in person at least twice per year.

In order to gather meaningful input from energy industry leaders and state and regional economic development professionals, a regional energy sector roundtable was held in May of 2014 to further inform site reuse planning in this area. The roundtable discussion focused on identifying opportunities to develop energy sector businesses at the PORTS site in the form of Public-Private Partnerships (P3s). Ohio University designed the roundtable concept in conjunction with IEDC and other national experts and in consultation with several energy industry leaders who were interviewed by telephone. This information resulted in a concept paper that guided the materials developed for the session, the participant recruitment, and the facilitation design for the roundtable.

The roundtable was well-attended and included representation from private industry, economic development, government, national level consultants, PORTS-SSAB, DOE, SODI, and site contractors. The Energy Sector Roundtable revealed key insights regarding the most feasible energy industries to pursue including: bio-chemicals (polymers, plastics, other); waste recycling/waste transformation (waste heat, municipal waste, anaerobic digestion, methane combustion, other); metals recycling; energy generation, energy storage and micro-grids; biofuels/bio-products; and coal alternatives (carbon capture and use, carbon capture and sequestration, clean coal, coal to liquids, RD&D, other) with an emphasis on employing an 'E3 approach' of harmonizing utilization of environmental resources to develop energy and provide economic benefit to the region.

During the winter of 2014/2015, Mike Zimmer Esq., an attorney, international energy business development expert, and Ohio University Voinovich School and Russ College of Engineering and

Technology Executive in Residence, authored an industry profile paper that discussed top energy sector industries viable for siting at PORTS. The paper can be viewed here:

<https://www.portsfuture.com/wp-content/uploads/2019/03/PORTSfuture-Energy-Sector-PORTS-Campus-White-Paper.pdf>

In February of 2016, Dr. Benjamin Cross P.E., Principal of NuSynergy Energy LLC, Ohio University Voinovich School Executive in Residence and formerly Senior Advisor for the Clean Energy Directorate at the Savannah River National Laboratory, authored a white paper on establishing an Appalachian Regional Energy Cluster. This white paper provides an overview of business (industry) clusters and discusses why the establishment of an Appalachian Regional Energy Cluster is considered a prerequisite for enhancing the viability of locating an Integrated Energy System-Closed Loop Manufacturing (IES-CLM) complex at the U.S. Department of Energy PORTS site. The white paper can be viewed here:

<https://www.ohio.edu/ce3/resources/upload/CE3-Appalachian-Regional-Energy-Cluster-White-Paper-Feb-2016-FINAL.pdf>

These papers served to guide grant activities in 2016.

2016-2019

Site repurposing activities were informed by and built upon the previous efforts cited above. At the request of the local community reuse organization, the Southern Ohio Diversification Initiative (SODI), OU site repurposing activities were directed to focus on supporting the development of an Integrated Energy System/Closed Loop, advanced Manufacturing (IES-CLM) complex at PORTS and align with insights garnered throughout previous site repurposing grant work. An IES-CLM complex will attract and expand industries in the region, leverage coal and shale resources in additive manufacturing applications, create jobs, and grow the southern Ohio economy.

This strategy includes employing a multi-disciplinary cluster approach for regional development utilizing the PORTS campus as one element of a regional economic diversification strategy. This approach is employed based on the notion that clusters develop across a geographic area and businesses provide synergy across/among each other, which will enhance cluster growth. This cluster approach was consistent with stated public preferences for site reuse cited above. Additionally, in the past 2-3 years, southern and eastern Ohio have been tagged as potential areas in which to site billion-dollar petrochemical industries that are related to the shale boom in Ohio and western Pennsylvania. The PORTS site has the infrastructure capacity to serve as a major petrochemical (petchem) industry hub.

Another burgeoning industry across the nation and especially in Ohio relates to data centers which consume vast amounts of electricity. Again, the PORTS infrastructure and interconnection to both the PJM and MISO national grids lends the PORTS site be an ideal location for a central hub for electricity generation, transmission, and distribution for decades to come. The DOE PORTS site is widely viewed as a major regional asset that can greatly enhance efforts to develop several regional clusters in the areas of energy, advanced manufacturing, transportation/logistics, and power generation, transmission and distribution and thus the site could be reindustrialized in these areas to enhance the economic viability of the region for many future generations of Ohioans.

Site repurposing activities-Current Grant Year 4

OU site repurposing activities include collaborating with SODI and other stakeholders on: master planning, site readiness and property transfer activities; data analysis; GIS; industry discovery and networking; collaborations/partnership building; project resource acquisition for SODI; and developing linkages to applicable Ohio University researchers and tech commercialization entities. Ongoing Technical Assistance, Public Outreach, Education, and Engagement for Property Transfer and Future Use activities include developing: property request guidelines; a property transfer plan; a phased-

implementation schedule; providing reindustrialization planning and progress updates, STEM educational activities for regional youth, and entrepreneurship outreach to community members in the four county region.

These activities will support the diversification of the regional economy by imagining possibilities beyond the immediate and existing economic realities in southern Ohio to identify what is needed to best prepare the PORTS site to attract 21st century industries with enduring missions. This will provide residents in the region access to 21st century job prospects, enhanced wages, and an overall improved quality of life. Site reindustrialization will spur regional cluster and supply chain-related growth throughout the impacted counties, further advancing economic healing by growing both large and small business opportunities in southern Ohio and beyond. OU Grant Year 4 activities are depicted in Figure 1 below.

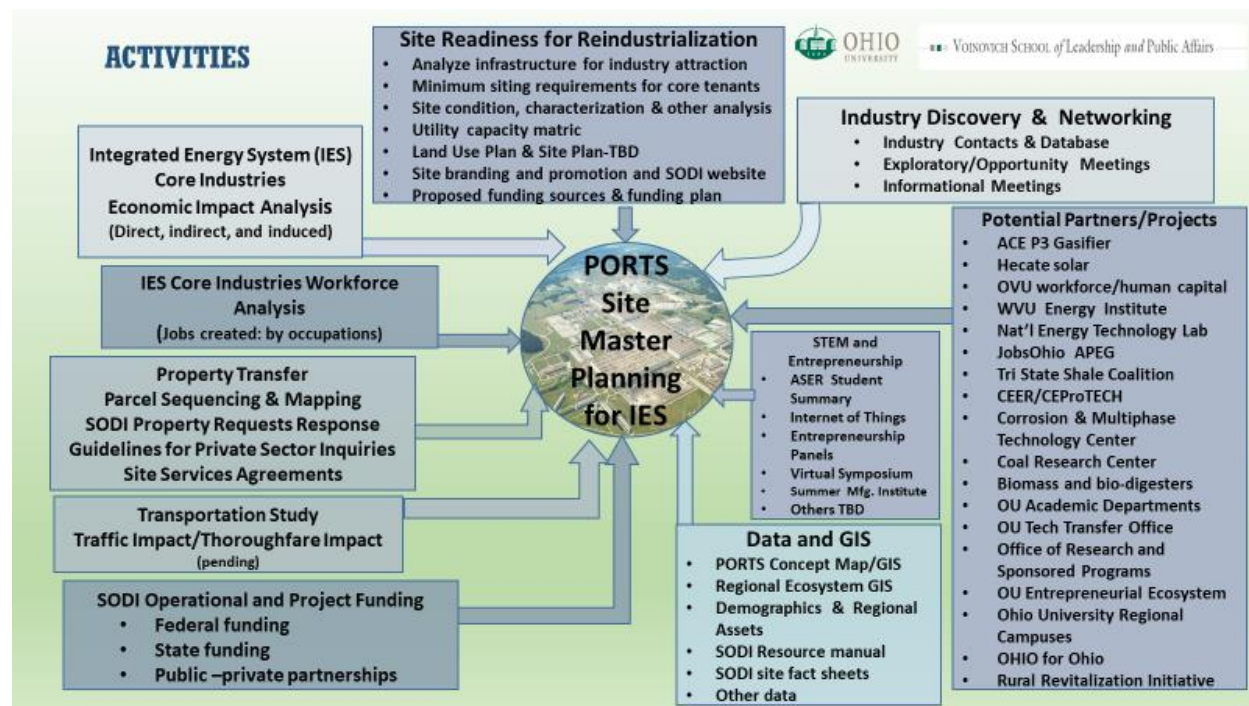


Figure 1-OU Grant Year 4 activities

Integrated Energy System-Closed Loop Manufacturing (IES-CLM) complex

The Southern Ohio Diversification Initiative is pursuing the development of an Integrated Energy System-Closed Loop Manufacturing (IES-CLM) complex at PORTS to leverage the unique infrastructure and other assets of the site to their optimal value for new economic growth opportunities.

The technical definition of an IES is two or more energy resources utilized as inputs to two or more physically coupled subsystems to produce one or more energy commodities as outputs. A simpler definition is multiple energy resources combined to produce one or more energy related products. An IES embodies a synergistic integration of an “all-of-the-above” energy strategy.

The key aspects of an IES-CLM are collocating, combining, interconnecting and/or networking of energy producers and energy users and utilizing waste outputs from one industrial process as an input or feedstock into a different industrial process. In an IES-CLM, the “whole” is worth more than the “sum of the parts”, value is the driver, and desired value propositions such as high efficiency, high reliability, low

emissions, low/acceptable production costs, and creation of more permanent, higher quality jobs are achieved. An IES-CLM results in industrial symbiosis as depicted in Figure 2 below.

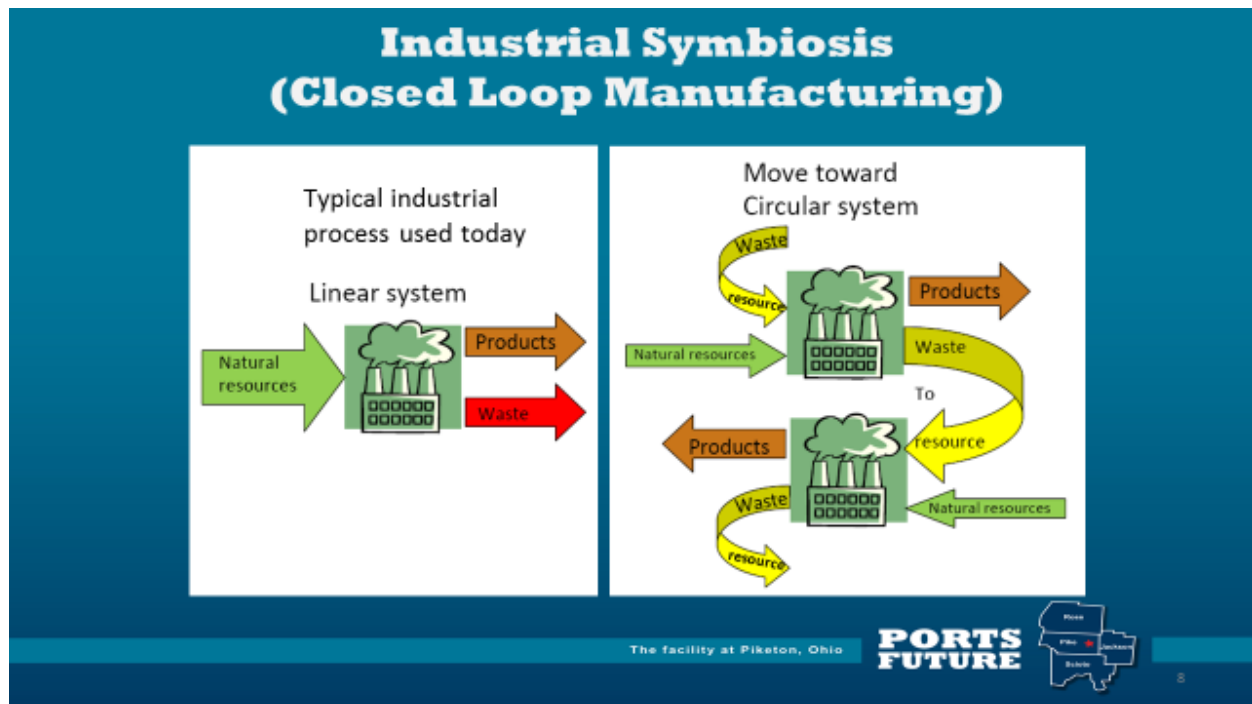


Figure 2-Industrial symbiosis depiction

IES-CLM complexes integrate high temperature heat with industrial technologies to: produce electricity for use by manufacturers, data centers, and residential consumers; supply predictable, low cost energy; power industrial processes such as carbon conversion (e.g. coal to liquids) and chemical production; and produce hydrogen for transportation fuels, polymers, plastics, fertilizer, and the hydrogen fuel cell market to name a few. Creating an IES-CLM at the PORTS facility will: serve and expand existing markets; create new markets; establish new applications for value-added manufacturing with the region's coal and natural gas assets; utilize hydrogen across components of the IES-CLM; develop flexible processes to accommodate market shifts; and utilize residual heat to drive low temperature processes such as water purification (e.g. distillation, osmosis) and enzymatic processes (e.g. fermentation, anaerobic digestion).

The Piketon IES-CLM Project is expected to develop in a series of phases:

- Pilot plant and demonstration activities
- Near-term (3 to 5 years): deployment of initial energy sources and process plant needed by industries to meet their market conditions and the regulatory environment
- Mid-term (5 to 15 years); transition and prepare for the potential addition of nuclear and other energy sources and process plants to accommodate changing economic and regulatory environments
- Long-term (15+ years): integration and optimization of energy sources and industrial process plant industries for changing economic and regulatory environments

A graphical depiction of the Integrated Energy System-Closed Loop Manufacturing concept follows in Figure 3 below. To view the IES-CLM complex technical concept diagrams, see Appendix 1.

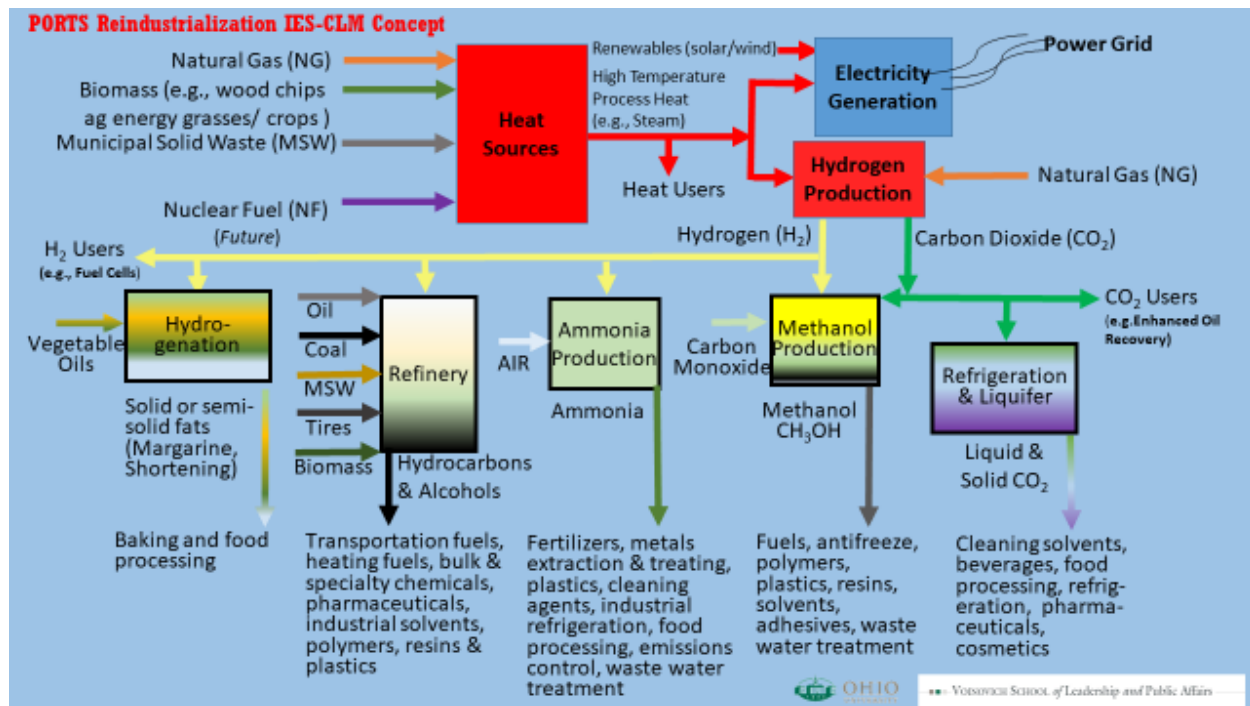


Figure 3-Integrated Energy System-Closed Loop Manufacturing Concept Overview graphic

Regional cluster development will occur with the growth of natural spin-offs from the core IES-CLM complex to be located at the former PORTS facility as various industries can realize more effective production costs when tied into an IES-CLM. Industries that are high hazard, high security, high investment, and/or require extremely high temperature process heat can be located within the secure area of the IES-CLM complex at the PORTS facility. Other industries can tie into the IES-CLM complex to access heat, electricity, hydrogen, and other production outputs via transportation networks (e.g. roads, rail, and pipelines). A depiction of the potential for regional cluster development with an IES-CLM complex follows in Figure 4 below.



Figure 4- Potential for regional cluster development with an IES-CLM complex

Reindustrialization of the PORTS site into an IES-CLM complex would serve as an excellent example of converting a national liability to a national asset, resulting in much-needed regional economic development. This effort is an extraordinary opportunity to demonstrate what can and should be done with former DOE Defense Nuclear Sites or other brownfield sites. The IES-CLM complex will provide enduring and non-exportable jobs focused on optimizing efficiency of energy production and energy utilization in a sustainable and environmentally responsible manner. Sustainability, recycling and the efficient use of the region's natural attributes/resources and its man-made industrial infrastructure are key drivers. Repurposing of coal assets to make new and innovative products is an excellent opportunity for economic development. Using coal and shale assets in additive manufacturing, and diversifying the regional economy will revitalize the region.

Activities to advance the IES-CLM complex will further SODI's mission to diversify the regional economy by imagining possibilities beyond the immediate and existing economic realities in southern Ohio to identify what is needed to best prepare the site to attract 21st century industries with enduring missions. Site reindustrialization will spur regional cluster and supply chain-related growth throughout the impacted counties and multi-state region, further advancing economic diversification by growing both large and small business opportunities in southern Ohio and beyond.

Citizens will have access to an increased number of high quality, higher-than-average paying jobs. Economic impact analyses and workforce analyses of prospective future jobs have been and continue to be conducted by Dr. Gilbert Michaud at OU. The region's entire economy will benefit from the site reindustrialization in the form of direct economic impacts (i.e. worker wages), indirect economic impacts (i.e. commerce and business revenue), and induced economic impacts (i.e. purchasing of good and services that will generate state and local tax revenue). It is impossible to overstate the impact that site reindustrialization will have on the region's economy as there have been no large-scale industry start-ups or expansions to replace the DOE former plant operations. A multitude of IES-CLM complex benefits are shown below in Figure 5-IES-CLM Impact.

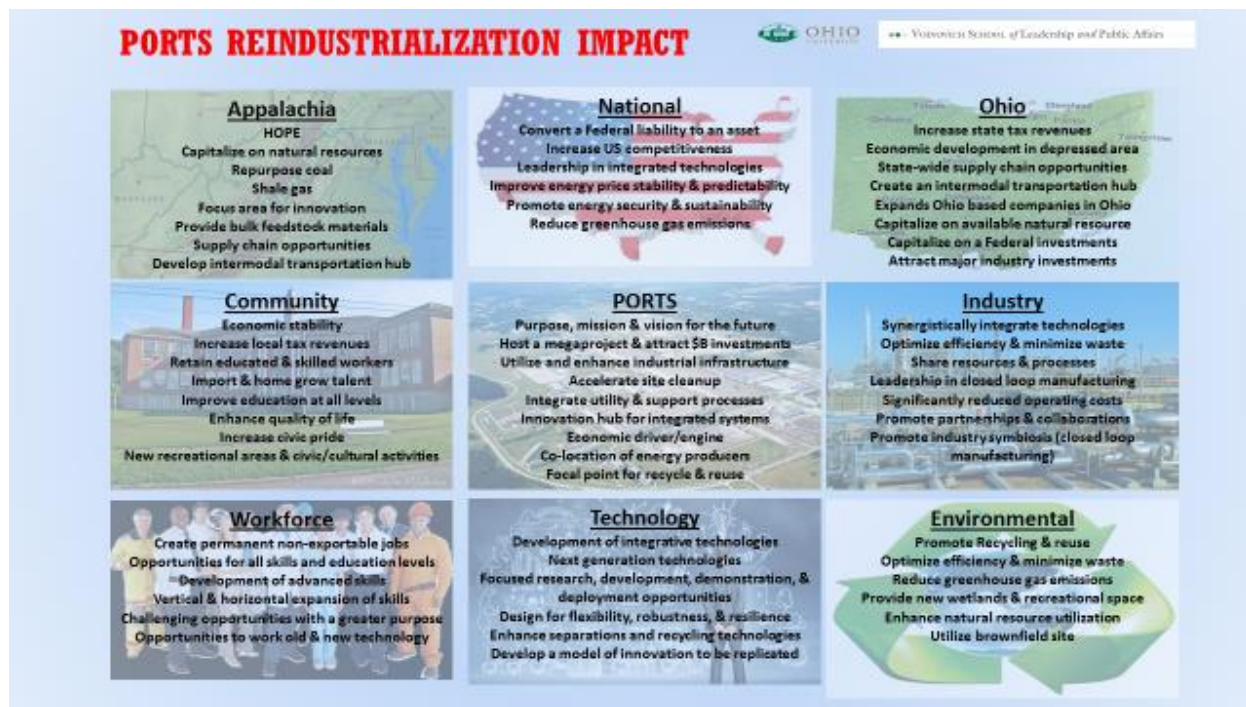


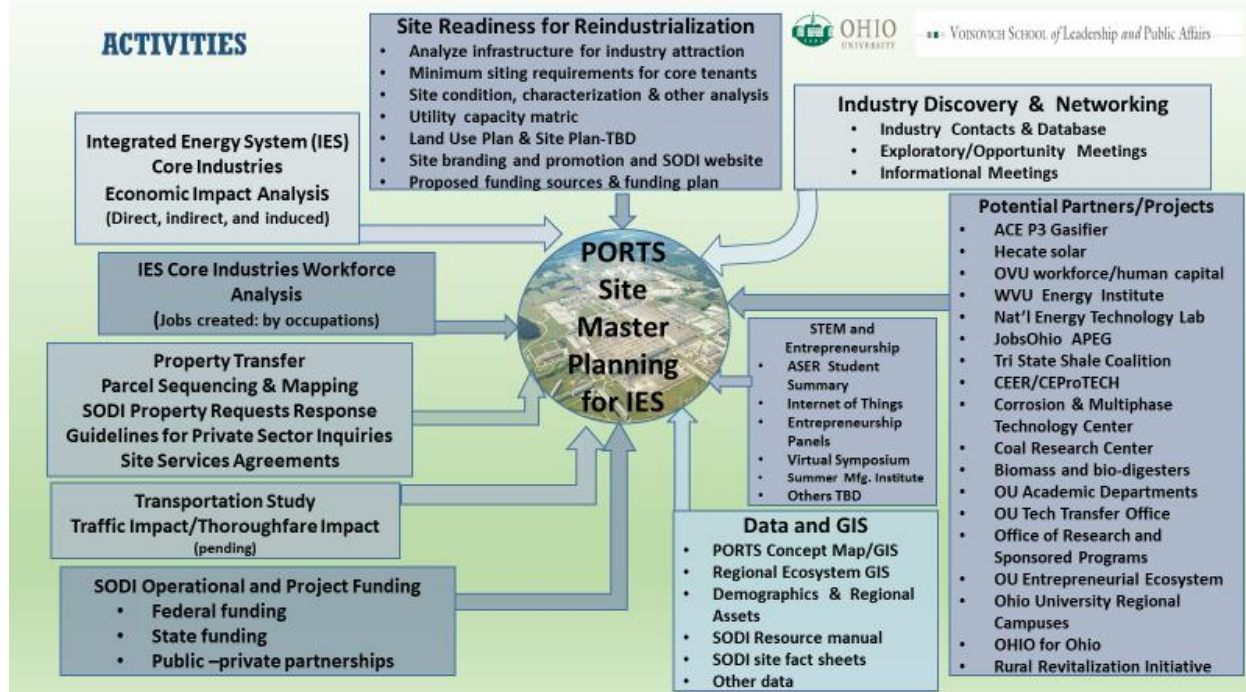
Figure 5-IES-CLM Impact

OU grant activities complement SODI's ongoing collaboration with an industry collaborative seeking to identify and pilot a versatile, next generation nuclear power technology at the PORTS site. The next generation nuclear reactor could serve as the long-term source of high temperature heat to power the IES-CLM complex at PORTS. This new technology would be attractive to energy-intensive heat and power-using industrial end-users who are seeking zero carbon, environmentally friendly energy sources in their production processes. Key concerns that must be addressed include mitigating the immense up-front cost to construct the reactors and resolving regulatory issues associated with the design and federal licensing of this new reactor technology so that it can be constructed and operated as a part of the IES-CLM complex at the PORTS site. SODI and the industry collaborative plan to continue to work closely with the government, the U.S. Department of Energy and others with the goal of effectively fostering this partnership.

Summary of Grant Year 4 Activities for Site Repurposing Continuation and Ongoing Technical Assistance, Public Outreach, Education, and Engagement for Property Transfer and Future Use

Some activities began in Grant Year 4 and will carry forward into Grant Year 5 as ongoing grant activities.

Brief narratives for each activity-area displayed follow the graphic below.



Site Readiness for Reindustrialization

The Southern Ohio Diversification Initiative (SODI) continues their focus on asset recovery operations by dedicating staff resources to this effort. Asset recovery involves SODI working with DOE and site cleanup contractors to identify, retrieve, recycle and/or sell personal property assets that are located at the PORTS site. By expanding asset recovery efforts, SODI will reduce landfill waste and increase revenue streams for regional economic development. Asset recovery proceeds are used by SODI for economic diversification initiatives in Pike, Ross, Scioto, and Jackson counties. These four counties served as the primary labor market for the PORTS site when it operated as a US DOE gaseous diffusion facility. The asset recovery proceeds are also used to accelerate the PORTS site reindustrialization efforts including working with Ohio University who allocates part of their DOE grant to create a viable land use plan, site plan, and related materials to further prepare SODI to comprehensively respond to prospective investment requests from industries. DOE EM funding appropriated to the site is dedicated to cleanup activities including funding for the DUF6 facility.

Site readiness for site reindustrialization activities focus on preparing parcels to be made available and undergo approval processes for reindustrialization. This includes: identifying industry types that would be a good fit for the available parcels; ensuring that the site can meet those industries' minimum siting criteria; analyzing the utility infrastructure in relation to industry attraction and determining minimum standards, identifying weaknesses and proposing funding sources to strengthen utility infrastructure; ensuring all basic geological, environmental, and other related site characterization studies are completed or identify gaps and studies that need to be completed to prepare the site for redevelopment; designing a frame work to ensure the site will meet the minimum validation by an external site selection agent; improving the SODI website; and assembling this information so that SODI can respond to and alleviate concerns of prospect companies which will be crucial to attracting industries. SODI formally received the first land parcel transfer at a ceremony held in July of 2018. Future parcel transfers are expected, thus SODI needs to accelerate site reindustrialization preparedness to quickly attract industries so that job creation can be realized for the region.

Data and GIS

As stated earlier, the purpose of the two activity areas summarized in this report is to serve the DOE EM cleanup mission. By expanding data utilization with site stakeholders at PORTS and in the region to enhance information-based decision making when determining viable future-use options for the site and site assets, the potential for cost savings/cost avoidance is enhanced as DOE cleanup efforts continue. Data and GIS created under previous grant activities will be maintained. New data and GIS products are being developed under the current grant. Current data activities are summarized in Figure 6 and described below.

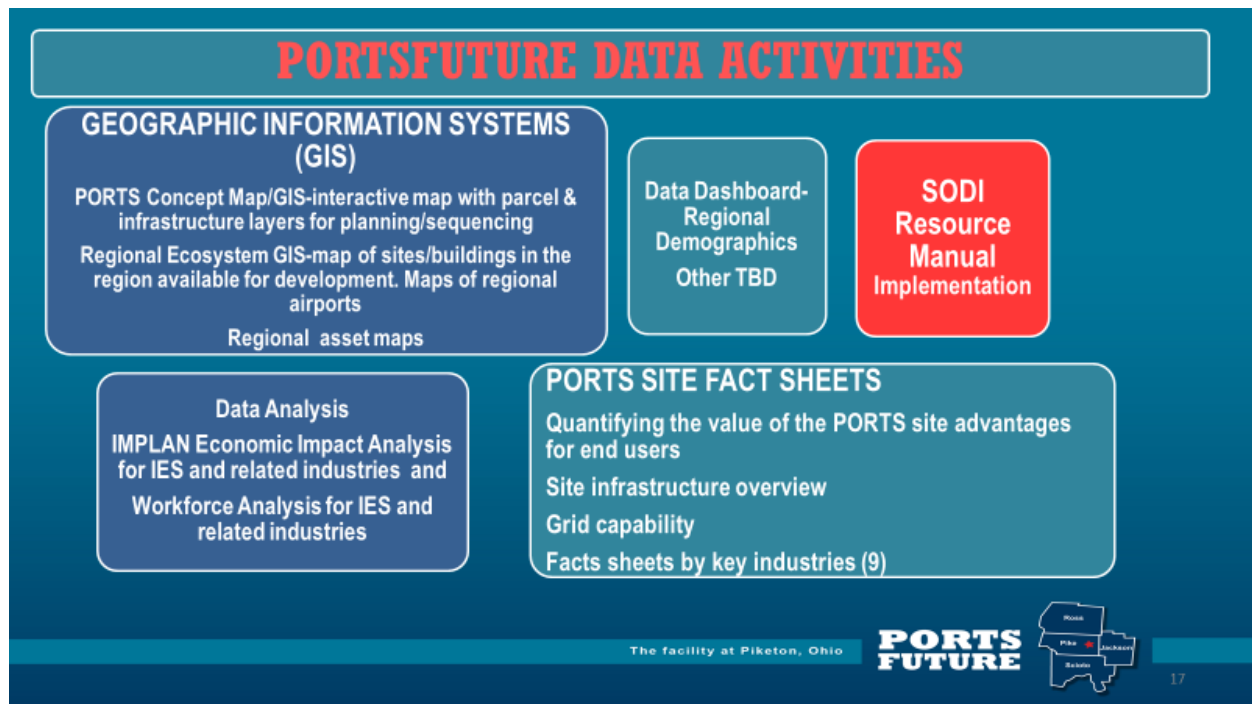


Figure 6-PORTSfuture Data Activities

Industries Economic Impact Analysis and Workforce Analysis

Ohio University conducted in the previous grant year, analysis on the direct, indirect, and induced economic impact and related workforce analysis on the four-county labor market closest to the facility (Pike, Scioto, Jackson, and Ross counties) of potential additive manufacturing industries (tier 2 industries) related to and IES. The following Grant Year 4 analyses on other potential site reindustrialization options add to findings of the data analyses conducted in the previous grant year.

Regional Energy Initiatives Related to Integrated Energy System Closed Loop Manufacturing (IES-CLM) Industries Economic Impact Analysis

Ohio University finalized analysis of the direct, indirect, and induced economic impacts on the regional labor market of regional energy initiatives including [cracker facilities](#) that are related to and IES-CLM.

The economic impact analysis report will inform site reindustrialization, local economic development planning efforts and workforce development strategies and will serve to inform the IES-CLM complex business case. This information can be used to seek support and/or resources from industry, government and the community in support of the development of an IES-CLM complex. Deliverables include brief summary documents that can stand alone or be compiled as part of a larger summary document and can be found at: <https://www.portsfuture.com/wp-content/uploads/2019/06/ECONOMIC-AND-WORKFORCE-IMPACT-ANALYSIS--CRACKER-FACILITY.pdf>

Draft electronic version of report in PDF format-March 2019
Final electronic version of report in PDF format-completed July 2019

Regional Energy Initiatives Related to Integrated Energy System Closed Loop Manufacturing (IES-CLM) Industries Workforce Analysis

Ohio University finalized analysis of the workforce skills and experience that will be needed by industries involved in regional energy initiatives including [cracker facilities](#) that are related to and IES-CLM.

The workforce analysis report will serve as a basis for local planning efforts and workforce development strategies to adequately prepare the local labor market (Pike, Scioto, Ross, and Jackson counties) for future jobs related to a functioning IES-CLM complex and related regional energy initiatives. This analysis also serves to inform the IES-CLM complex business case. This information can be used to seek support from industry, government, the community, and education providers to secure resources for developing programs for workforce development. Deliverables include brief summary documents that can stand alone or be compiled as part of a larger summary document and can be found at: <https://www.portsfuture.com/wp-content/uploads/2019/06/ECONOMIC-AND-WORKFORCE-IMPACT-ANALYSIS--CRACKER-FACILITY.pdf>

Draft electronic version of report in PDF format- March 2019
Final electronic version of report in PDF format-completed July 2019

Regional Industry Initiatives Related to Integrated Energy System Closed Loop Manufacturing (IES-CLM) Economic Impact Analysis

Ohio University finalized analysis of the direct, indirect, and induced economic impacts on the four-county labor market closest to the facility (Pike, Scioto, Jackson, and Ross counties) of [data centers](#) that can be co-located within an IES-CLM complex.

The data center economic impact analysis report will inform site reindustrialization, local economic development planning efforts and workforce development strategies and will also serve to inform the IES-CLM complex business case. This information can be used to seek support and/or resources from industry, government and the community in support of the development of an IES-CLM complex. Deliverables include brief summary documents that can stand alone or be compiled as part of a larger summary document and can be found at: https://www.portsfuture.com/wp-content/uploads/2019/06/ECONOMIC-AND-WORKFORCE-IMPACT-ANALYSIS_DATA-CENTER.pdf

Draft electronic version of report in PDF format-March 2019
Final electronic version of report in PDF format-completed July 2019

Regional Industry Initiatives Related to Integrated Energy System Closed Loop Manufacturing (IES-CLM) Workforce Analysis

Ohio University finalized analysis of the workforce skills and experience that will be needed by [data centers](#) that can be co-located within an IES-CLM complex.

The data centers workforce analysis report will serve as a basis for local planning efforts and workforce development strategies to adequately prepare the local labor market (Pike, Scioto, Ross, and Jackson counties) for future jobs related to a functioning IES-CLM complex and serve to inform the IES-CLM complex business case. This information can be used to seek support from industry, government, the community, and education providers to secure resources for developing programs for workforce development. Deliverables will include brief summary documents that can stand alone or be compiled as part of a larger summary document and can be found at: <https://www.portsfuture.com/wp->

content/uploads/2019/06/ECONOMIC-AND-WORKFORCE-IMPACT-ANALYSIS_DATA-CENTER.pdf

Draft electronic version of report in PDF format-March 2019

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Utility Matrix and Permit Inventory

OU developed and finalized a utility matrix and permit inventory in Grant Year 4. The utility matrix provides an at-a-glance view of utilities' current capacity, current usage, excess capacity, and other notes of importance for industries looking to site operations at PORTS. OU created an index/matrix of infrastructure requirements for targeted industries (e.g. water, gas, electric, security, other) that could serve to identify assets to preserve rather than demolish resulting in potential for DOE cost avoidance in this effort. The utility matrix will provide useful data points on investments an industrial tenant might need to consider in order to make use of an asset that might otherwise be disposed. The utility matrix will continue to be updated based on targeted industry need and is available upon request and at the discretion of the community reuse organization known as SODI.

Draft electronic version of report in PDF format-May 2019

Final electronic version of report in PDF format-September 2019

Plastic Waste Stream Analysis for Southern Ohio-Research on availability of plastics by type and volume within a 90-mile drive of PORTS was conducted to provide information to a private sector company interested in possibly siting a plastics gasification operation on SODI parcels. Report can be viewed at: <https://www.portsfuture.com/site-reuse/>

Draft electronic version of report in PDF format-October 2019

Final electronic version of report in PDF format-completed December 2019

SODI Resource Manual Implementation Follow Up-During calendar year 2017, Ohio University provided ~\$50,000 in non-DOE funds toward a collaboration among OU, private sector consultants, and SODI to create a comprehensive site reindustrialization resource manual. The manual is for use by SODI and other regional and state economic development entities working on the reindustrialization of the PORTS site consistent with the IES-CLM concept diagram shown in Figure 3 above and the IES-CLM technical concept diagrams that depict the mechanical and chemical engineering components of an IES complex shown in Appendix 1 below. In Grant Year 4, OU continued discussing with SODI the implementation of recommendations in the manual and OU will continue to work with SODI as requested on carrying out recommendations in the manual. Requests to review the manual can be directed to SODI. Deliverables to be determined.

SODI Fact Sheets-Quantifying the value of the PORTS site advantages for end users will be vital to attracting industries to the site. Facts sheets have already been developed for site infrastructure, grid capability, combined cycle gas turbine facility, and four types of refineries and can be viewed here <https://www.portsfuture.com/site-reuse/>

SODI Fact Sheets continue to be developed and will include relevant data and GIS on the areas described below. These products will assist SODI in responding comprehensively and expeditiously to private sector and other inquiries about the site and site assets and will thus enhance site reindustrialization efforts.

Facts sheets to be developed may include and may not be limited to:

- Data centers
- Ammonia (fertilizer) plant
- Government R&D (DARPA, ARPA-E, national intelligence, etc...)
- National and regional security and emergency response services (e.g. FEMA, energy security, refinery security, etc...)

Data Dashboards-Maintaining previously developed data dashboards. Collection of quantitative and qualitative data to employ in SODI's site reindustrialization strategy resulted in the creation of a prototypical web-based data dashboard for interactive data analysis related to site repurposing task activities. The data dashboard visually displays relevant regional demographics of workforce-aged residents useful for future site use decision-making. It allows users to quickly access data on the four county region for various datasets including:

- Population - Total population and percent change in population over time.
- Demographics - The breakdown of total population by age groups and educational attainment.
- Detailed Demographics - The distribution of educational attainment by specific age categories.
- Student Enrollment - Student enrollment by sector and admission area.
- Migration - In-migration, out-migration, and net migration flows for the four county region.
- Employment by Industry - Total employment by industry sector in the four county region.
- Employment by Occupation - Total employment by major occupational categories in the four county region.
- This dashboard can be viewed at: <http://app.voinovichschool.ohio.edu/datateam/portsdata/>

This dashboard can be updated with new US Census 2020 information pending future grant funding.

Asset Map-Maintaining, expanding, and modifying as requested the existing regional asset map. This map visually displays relevant regional assets useful for future site use decision-making such as highways, hazmat routes, rail, airports, navigable waterways, accredited education institutions, metro centers, population that can be reached within various drive times from the site, and many other data points. This map can be viewed at:

<http://ohiou.maps.arcgis.com/apps/webappviewer/index.html?id=e5e8bf0c28464fa9b558cd6064afce98>

PORTS Concept Map –maintaining, expanding, and modifying as requested the interactive site map that displays various layers including site infrastructure, easements, broadband points of presence, topography, limitations, parcel transfers, and other information to be used in site planning efforts. This is a GIS database creating a land use, site master planning tool that enables the user to display various layers such as topography, site infrastructure assets, wetlands, landfills, and other features in relation to developable parcels. This GIS tool will assist in assessing suitability to industry siting criteria and with other activities related to planning for reindustrialization. This interactive GIS database can be viewed at: <https://ohiou.maps.arcgis.com/apps/webappviewer/index.html?id=fe14a57f8ccb48d4875cbfbef17e0271>

Principal Influencers Diagram and Industry Database expanded and maintained for the Appalachian Energy Hub (a.k.a. Appalachian Petrochemical Initiative) and IES-CLM Complex proposed for PORTS. Created Influence Diagram for Tri-State Shale Coalition and maintained industry contact database organized by industry category. This database will identify initial anchor, complimentary, and support industries for developing an IES-CLM complex at PORTS. Relationships would need to be established with the industries and economic developers to drive the development of the IES-CLM complex.

SODI Website Redesign

OU finished the redesign of the SODI website in Grant Year 4 in collaboration with SODI and an outside vendor. The goal was to design and build a website for SODI that is easy to navigate and provides useful information to target audiences. This website will be finalized after the SODI board reviews and signs off or provides suggestions for changes to the website. Audiences for the website include industry prospects, businesses, nonprofits, economic development professionals, and general inquiries. OU collaborated with SODI to determine website needs, conceptualized/advised on long-term needs of the website, utilized proposed site map components to build the website, contributed to development of SODI organizational identity and style, reviewing/revising preliminary design concept for the new website, provided website content, and advised on the design concept, basic page layout, color palette, font choices, etc.

SODI and OU contributed to content creation for each relevant webpage on the new website and the vendor created new content as needed. The website can be viewed at: <http://www.sodidevelopment.org/>

Draft website-completed June 2019

Final website-completed September 2019

Ongoing Technical Assistance, Public Outreach, Education, and Engagement for Property Transfer and Future Use: property transfer, STEM, and entrepreneurship activities

Property Requests Response Guidelines

Initial planning for this activity began in Grant Year 3 and during Grant Year 4, OU and SODI continued to gather information from other former DOE sites on how property transfer and reuse has been effectuated. At the request of SODI, Ohio University, in collaboration with SODI, will develop tools/templates for requests for property. This includes SODI requests to DOE for property and includes private sector request to SODI for property. OU will: assist SODI in developing a property transfer plan, phased-implementation schedule, and a proposal protocol for property transfer requests; identify areas on the site that are not good candidates for building (and remove them from consideration in the property transfer proposal process); define steps for the transfer process and identify documentation needed for each involved party; establish criteria for reviewing proposals and business plans that are submitted for consideration; develop a process for making requests that may include creating GIS maps for areas that are 'build-able' based on the needs of the requester; and develop metrics and standards for assessing/monitoring proposals and performance. Deliverables and due dates will be jointly determined by Ohio University and SODI. During GY4, Ohio University made inquiries of other DOE sites to seek/access information on their property requests/property transfer activities. SODI has tabled this activity for the time being and we will resume this activity at the request of SODI.

Draft electronic version of report in PDF format-target date-TBD

Final electronic version of report in PDF format-target date-TBD

STEM Activities

Science, Technology, Engineering, and Mathematics (STEM) enrichment activities are designed to encourage regional students to learn about and engage in activities in STEM disciplines with the goal of encouraging students to pursue careers in these in-demand fields that provide well-paying employment opportunities. These activities may help prepare the future workforce in the region to be job-ready when site reindustrialization efforts are realized. PORTSfuture STEM activities are summarized in Figure 7 and described below.

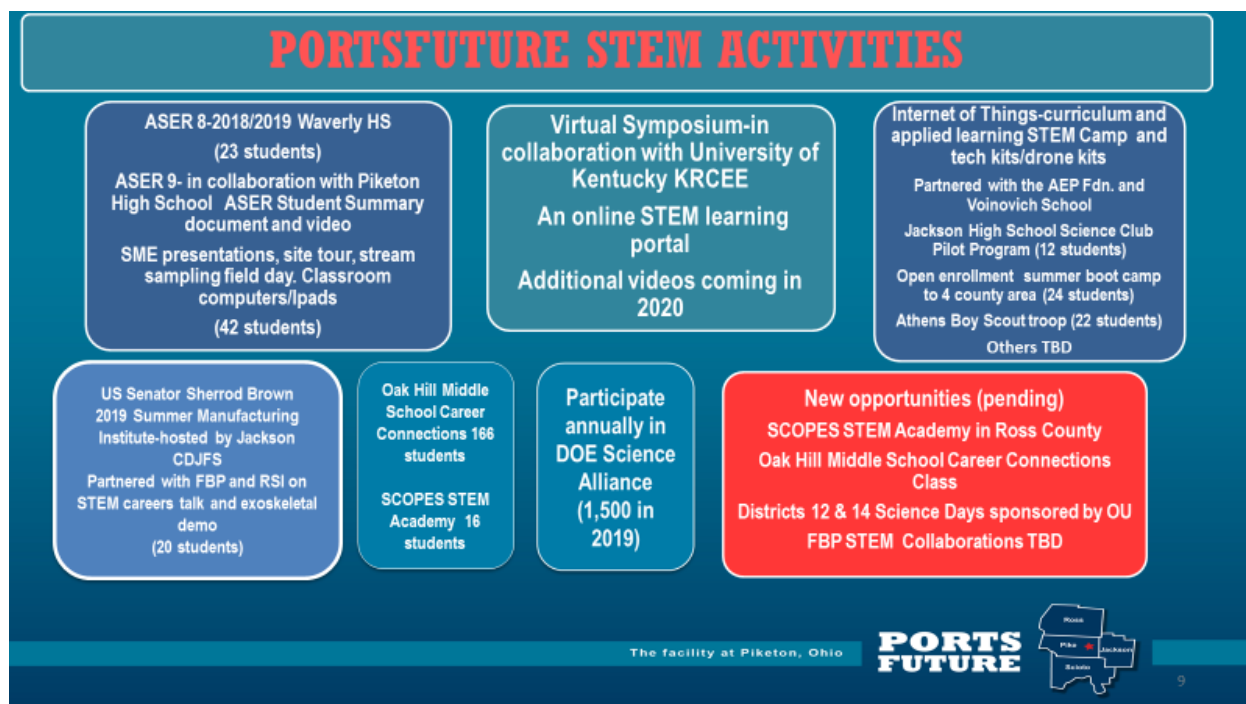


Figure 7-PORTSfuture STEM Activities Grant Year 4 and ongoing

ASER 8 & ASER 9

ASER 8 (primarily funded under a separate activity within the grant)-Ohio University worked with the advanced placement biology teacher and 23 students at Waverly High School in Pike County to produce the 8th Annual Site Environmental Report Student Summary that provides information to the public regarding the U.S. Department of Energy's progress on cleanup work at PORTS. Students received SME seminars on site history, site cleanup and other environmental engineering topics; met with SSAB members; participated in a site tour; and participated in an applied field learning experience during the timeframe of August 2018-April 2019 to inform their writing of the ASER summary document.

The final report and video were completed by August 31, 2019 and can be viewed here:

<https://www.portsfuture.com/aser-8/>

ASER 9 (primarily funded under a separate activity within the grant)-Ohio University is working with the chemistry teacher and 42 students at Piketon High School in Pike County to produce the 9th Annual Site Environmental Report Student Summary. This summary provides information to the public regarding the U.S. Department of Energy's progress on cleanup work at PORTS. During the 2019/2020 academic year, students received Subject Matter Experts (SME) seminars on site history, site cleanup and other environmental engineering topics and participated in a classroom presentation from DOE to provide an overview of the site. The applied field learning experience did not occur due to the movement to online learning necessitated by the global coronavirus/COVID-19 pandemic of 2020. The final student-generated report and video will be completed by August 31, 2020

Internet of Things STEM Outreach Project in Collaboration with the AEP Foundation

The Internet of Things (IoT) is affecting almost every aspect of our lives — this rapid integration of the physical and digital worlds is fundamentally changing many aspects of our lives and businesses, from people to devices, to data and processes, and will create new opportunities for entrepreneurs and job seekers. The things around us (e.g., renewable energy sources, home appliances, industrial equipment, smart energy monitoring devices, medical devices, and entertainment devices) are becoming

interconnected, enabling them to exchange information and allowing us to monitor and control them remotely. The Internet of Things (IoT) project offers an interdisciplinary approach to critical thinking, creative problem solving, programming, and data science around the subject of IoT. Students learn about hardware and software through mentoring, workshops and/or boot camps; build hardware and software to collect, exchange, analyze and compare real-world sensor data through the Internet; choose appropriate sensors and collect data; use microcontrollers to transfer data from sensors to the Internet; apply web tools to remotely analyze the data; send processed information back to a device; control electronic systems over the Internet; apply the information to solve problems; and predict key trends in emerging IoT industries.

In GY4, Ohio University conducted two, IoT STEM Summer Camps. One camp was a developmental pilot held in Athens County with an OU staff member's Boy Scout troop with 22 scouts attending the two day camp. The other camp was held at the Ohio University Regional Campus in Ross County and was an open enrollment camp for the four-county area of Pike, Scioto, Ross, and Jackson counties with 24 youth attending the two-day event.

This effort was funded through a partnership between the PORTSfuture Program funded by US DOE EM PPPO, the AEP Foundation, and the OU Voinovich School. This project emphasized the growing role of "smart" technologies in everyday life and offered hands-on learning to ignite students' interest in science, technology, engineering and math (STEM) careers. Participants learned about circuits, computers, engineering design, coding, and energy sources, and then applied their new knowledge to hands-on activities such as programming a drone and a weather station. Each student received their own drone kit to take home to continue their applied learning. For a video of the 2019 programs and to view lesson plans, see this link:

<https://www.portsfuture.com/internet-of-things/>

Grant Year 5 will focus on expanding involvement by youth in the four county area at the IoT summer camp during the summer of 2020.

Science Alliance

As in years past, PORTSfuture was delighted to participate in the DOE PORTS annual Science Alliance event held in October 2019 that provides over 1,500 high school students access to a variety of interactive kiosks to learn about careers in environmental and engineering fields. The Voinovich School's Raccoon Creek/Watershed team and AmeriCorps volunteers provided a display that included a live stream table with live fish and macroinvertebrates for the students to explore and students learned about stream health and stream cleanup methods.

U.S. Senator Sherrod Brown Summer Manufacturing Institute (SMI)

U.S. Senator Sherrod Brown's office launched summer manufacturing camps six years ago geared for students grades 4-8 in approximately twenty counties across Ohio. PORTSfuture was invited to join this effort and attended a statewide summit in January of 2019. The goal of these institutes is to provide Ohio's youth information about manufacturing careers in their communities and to encourage an interest in STEM education for students of all backgrounds. In Grant Year 4, PORTSfuture partnered with the existing Jackson County SMI and the DOE prime contractor at PORTS to discuss STEM careers with the 20 SMI student attendees and to provide a hands-on demonstration of the DOE exoskeletal equipment utilized to enhance worker safety and performance in STEM jobs at the PORTS site. PORTSfuture and the DOE prime contract will seek out similar opportunities to engage with US Senator Brown's SMI during the summer of 2020.

Virtual Symposium

Grant Year 4 included maintenance of the Virtual Symposium, which is a joint collaboration between the Voinovich School of Leadership and Public Affairs at Ohio University (OU) and the Kentucky Research

Consortium for Energy and the Environment at the University of Kentucky (UK). These activities are funded by grants administered by DOE's Office of Environmental Management Portsmouth/Paducah Project Office. Primarily funded under a separate task, the Virtual Symposium provides ongoing access to scientific and technical presentations for STEM education interests. The video presentations, Power point presentations, and project reports can serve as useful Science, Technology, Engineering, and Math (STEM) education tools for area schools, colleges, and universities. The Virtual Symposium also provides valuable information to the public at large about projects related to OU activities conducted at the DOE Portsmouth Gaseous Diffusion Plant (PORTS) site near Piketon, Ohio and UK activities conducted at the DOE Paducah Gaseous Diffusion Plant (PGDP) site near Paducah, Kentucky. We intend to add several videos in Grant Year 5 which may include videos on economic impact modeling/workforce identification, utilizing geographic information systems (GIS) and other data, PORTS site assets overview, and/or others to be decided. The Virtual Symposium can be viewed at:

<https://www.portsfuture.com/virtual-symposium-2/>

New STEM Opportunities Being Developed in Grant Year 4 and Continuing in Grant Year 5

Oak Hill Middle School/Buckeye Hills Career Center-Career Connections Class presentations during Grant Year 4

Title of presentation: "AI + IoT + Sharing Economy"

Curriculum summary: Discussion and demo about Artificial Intelligence (AI) and Internet of Things (IoT), the Sharing Economy and STEM careers for the 8th graders. Three sessions were conducted with 81 total participants (44 female, 37 male). Ages of attendees (or grade if it is a school class): one middle school class, a high school IT class, and a high school interactive media class. Two additional sessions to discuss and give demo about AI + IOT + Sharing Economy with IT/IoT career connections and pathways will be scheduled in Grant Year 5.

Title of presentation: "OHIO University's GRID Lab: Virtual Reality and Beyond

Curriculum summary: STEM and IT topics, virtual reality technology, and OU's GRID Lab. Three sessions were conducted with 85 total participants (50 female, 35 male). Ages of attendees (or grade if it is a school class): one middle school class, a high school IT class, and a high school interactive media class.

SCOPES (Science Cooperative of Physicians and Elementary Students) STEM sessions

One session was held in Grant Year 4 (see below) and others will be scheduled in Grant Year 5. Collaboration discussion on STEM activities with DOE prime contractor will occur during the spring/summer of 2020.

Title of presentation: Internet of Things and Smart Tech

Presented to: Union-Scioto Local School District, Unioto Elementary School 5th Graders

Curriculum summary: The program began with a presentation on the basics of the Internet of Things (IoT) with age-appropriate examples like "Alexa". The class then split into three groups and circulated between demonstrations of drones, virtual reality cars, and a weather station. Staff and undergraduate student team met in small groups with the 5th graders to provide feedback on their school science fair projects in development. In the second session, the students will meet at the OU-Chillicothe campus computer center for hands-on computer programming related to smart technologies, microprocessors, sensors and LEDs. This group is part of a STEM pull-out program at Unioto. The program finished with a discussion about Arduino coding to prepare the class for the second meeting at the OU-Chillicothe

computer lab where they will learn the basics of computer programming applied to an mBot. Sixteen students attended (11 boys and 5 girls) with ages of attendees in the age range of 5th Graders.

Classroom STEM Offerings-STEM activities developed for Grant Year 5 by OU can be offered onsite in classrooms across the four county area in southern Ohio. We have created a body of work around renewable energy, and the Internet of Things/smart technology, water quality, physical features of lakes and streams, acid mine drainage, analyzing chemical and biological data, and collecting water quality data as a citizen scientist that translates across ages and grades. Working with local teachers, we are able to tailor single class period sessions to their curriculum needs and interests. Hands-on activities augment these programs where possible. Career pathway discussions are integrated into programs for middle and high school students. We are currently reaching out to school districts in the four county area with a special focus on engaging Scioto County school districts.

Science Days- In collaboration with Ohio University's Voinovich School, the District 12 and District 14 Science Days serve students from most of southern and southeastern Ohio, including Ross and Jackson Counties in District 12 and Pike and Scioto Counties in District 14. Students in grades 5-12 can compete by presenting their original projects following either standard scientific method or engineering design principals. Through inquiry-based, project learning, students gain skills in posing a research question, creating a hypothesis, method development, data collection, data analysis, and written and oral communication. The Ohio Academy of Sciences has developed standards linkage for science fair across grades 5-12.

Students earning a "superior" at their school fair qualify to compete at their District Fairs and those earning superiors at District qualify to compete at State Science Day held at The Ohio State University in Columbus each May. High school students in both districts have the additional opportunity to qualify for the Buckeye Science and Engineering Fair which allows them to compete for a spot at the International Science and Engineering Fair; high school students in District 12 have the opportunity to compete for a spot at the International Fair straight from the district. The potential for learning, exposure to a community of engaged young scientists, and competition for scholarships and awards for students from southern Ohio is unparalleled. We are currently developing an implementation plan to reach out to students in Districts 12 and 14 during Grant Year 5.

Exploring Opportunities for Onsite Academic Initiatives

Last grant year, DOE PORTS inquired about exploring opportunities for utilizing the PORTS site for academic research and teaching initiatives for Ohio University faculty and students in the region. DOE PORTS offered to provide access to the site, data, and Subject Matter Experts (SMEs). Various faculty have expressed interest and will attempt to capitalize on DOE's generous offer if/when able to do so.

Last year, Ohio University Chillicothe Campus developed and is pursuing the following:

- Ohio University-Chillicothe Campus and Ohio University-Southern Campus-Interested in pursuing opportunities to incorporate the PORTS site, data, and Subject Matter Experts (SMEs) into their Associate Degree in Applied Science Environmental Engineering Technology program; utilizing SMEs to teach in the program; utilizing site data and SMEs for faculty and/or student research projects; creating visiting faculty fellowships; site tours/field trips for faculty and students; and expanding internships for Environmental Engineering Technology students at the DOE site. Previous internships have turned into full-time jobs at the DOE site for former students in this degree program.

Interest expressed from OU faculty and researchers at the Ohio University Athens campus includes the following and may be pursued during the next academic year:

- Voinovich School faculty hydrologist expressed interest in utilizing the site for class field trips for a multidisciplinary course in Watershed Management. This would include a site tour and discussion of storm water management on site, pump and treat system, slurry wall on the south boundary, sediment ponds near the switchyards and the disposal cell, and wetland and headwaters mitigation from the disposal cell.

Student research ideas utilizing the site/site data/site SMEs might focus on the water impacts of climate induced extreme weather events including exploring the rainfall-runoff characteristics of the previously industrialized area of the site and developing predictions for how that would vary with extreme weather events. The outputs of this modeling could be used to: model different infiltration scenarios and plume migration in a changing climate; examine storm water infrastructure resiliency in a changing climate; establish and monitor geomorphological, flow, and sediment transport characteristics of streams on site; and model future conditions.

- Voinovich School faculty ecologist focused on bioenergy and biomass products expressed interest in utilizing the site for class fieldtrips to demonstrate remediation and legacy infrastructure and is interested in the site's phytoremediation projects for research/ student research.
- Associate Dean for Industry Partnerships at the OU Russ College of Engineering and Technology (RCE&T) will discuss with the Dean and the RCE&T Center and Institute Directors, and extend DOE's offer to provide access to the PORTS site, Subject Matter Experts (SMEs), and data for faculty interested in pursuing academic endeavors. He will also speak with engineering student clubs, as they may be interested in site tours or access to data and SMEs.

Transportation Study/Traffic Impact/Thoroughfare Impact Study (pending)

At the request of SODI, OU began exploring the planning of a transportation study/traffic impact/thoroughfare impact study. This activity is currently tabled until SODI's site reindustrialization initiatives are more fully formed.

SODI Operational and Project Funding-SODI Financial Plan

An on-going activity in Grant Year 4 was beginning to develop in partnership with SODI a financial plan for SODI. The financial plan will be employed in collaboration with SODI to increase SODI's capacity to obtain the resources necessary to transform PORTS into an Integrated Energy Systems-Closed Loop Manufacturing (IES-CLM) Complex and to pursue complementary missions and facilities.

Initially in the near-term, economic development funding is needed to establish a project development team with a full-time person to lead and coordinate the development of a Master Plan and subsequent Execution/Implementation Plans, including a Financial Plan, that are in harmony with State of Ohio and regional economic development strategies and efforts to the maximum extent possible. Additionally, funding is needed for site readiness activities/analysis, identifying potential project opportunities, and other activities to prepare PORTS for transformation. In summary, the initial economic development funds are to be used for:

1. Expansion of Asset Recovery efforts
2. Compensation for a Project Development Team, Leader and Professional Support Staff
3. Development of a Master Plan for transforming PORTS
4. Development of Execution/Implementation Plans

After the initial planning is complete, funding will be needed to execute and implement plans for rebranding and promoting PORTS transformation to an IES-CLM complex in a phased approach that is sequentially compatible with DOE's cleanup efforts. Funding will be needed to identify and engage industries on specific projects for inclusion in the IES-CLM complex. Long-term funding should be project based and funding will be needed to ensure that projects are synergistically integrated within the present and future aspects of the IES-CLM complex.

Pursuing additional funding resources

Accomplishments in Grant Year 4 include:

- PORTSfuture updated a proposal that PORTSfuture had written on behalf of SODI for a State of Ohio Capital Budget funding request in the amount of \$250K for the purpose of expanding asset recovery, site readiness, and infrastructure improvement projects on parcels transferred to SODI. SODI will submit the request to the Ohio General Assembly for funding consideration.
- PORTSfuture tracks and summarizes available sources of new state and federal initiatives related to infrastructure improvements, industrial park improvements, and other related programs for which SODI may qualify. PORTSfuture will assist SODI as requested in pursuing any of these opportunities.
- PORTSfuture continues to provide monthly summaries of federal grant funding opportunities that align with SODI's site reindustrialization intentions. PORTSfuture will assist SODI as requested in pursuing any of these opportunities.
- PORTSfuture continues to advise SODI on public/private partnerships aligned with SODI's work. Ohio University offers to support SODI in pursuing such partnerships if SODI chooses to do so as part of the aforementioned SODI financial plan.
- Congressional Legislation Update has been created and is being maintained which contains proposed Congressional bills that can impact PORTS reindustrialization efforts and the surrounding Appalachian region. This information is reviewed periodically with SODI.

OU PORTSfuture data and reports conducted in previous grant years that continue to inform site repurposing efforts include:

Habitat Mapping of the Land and Vicinity of the United State Department of Energy (DOE) Portsmouth Gaseous Diffusion Plant (PORTS) Pike County, Ohio-Under this 2-year task, OU compiled a fully georeferenced database from DOE, State, and public sources; completed a data gap analysis of the georeferenced data; and created a detailed land cover map of the PORTS site, including a 1-mile buffer around the site. Report and land cover map available at:
<https://www.portsfuture.com/habitat-and-land-use-plan/>

Wetland and Primary Headwater Streams Mitigation Conceptual Design Plan-The task resulted in the preparation of a mitigation conceptual design plan, including a wetland mitigation bank proposal, which could be used by PORTS to compensate for potential unavoidable losses to waters of the United States (Clean Water Act Section 404 jurisdictional wetlands and headwater streams as regulated by Ohio EPA). This task applied to only the approximately 3,000 acres of federally owned lands outside of the central high security zone and to such other proximate lands that may be identified as potential locations for headwater stream mitigation. Wetland mitigation analysis and planning was limited to federal lands outside the central high security area. Report available at:
<https://www.portsfuture.com/habitat-and-land-use-plan/>

Outreach, Partnerships and Networking Support

Entities listed above in the figure 1 current grant activities graphic have offered interest in supporting/assisting SODI's reindustrialization efforts, with activities to be determined as appropriate. PORTSfuture also provides support to SODI in regional outreach, partnership building, and networking support activities to: inform site stakeholders and citizens of site reuse activities; engage economic development professionals and elected officials; identify private sector interests aligned with site reindustrialization goals; to broaden contacts with potential collaborators; develop partnerships; and share information to support SODI's site reuse mission. These activities are summarized in Figure 8- PORTSfuture Outreach Activities.

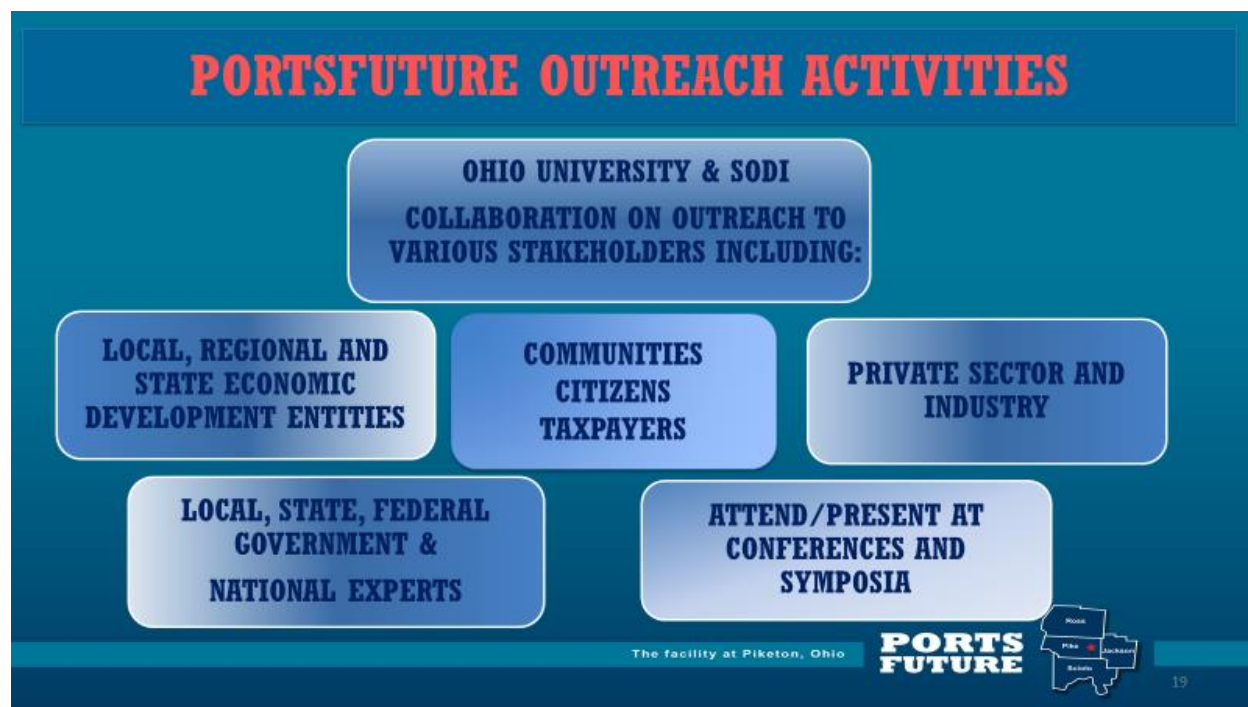


Figure 8-PORTSfuture Outreach Activities

Dissemination of Program Activities

Project website: www.portsfuture.com , used widely to disseminate information, resources, reports, videos, and other deliverables.

Press releases on specific events and activities when applicable, especially related to STEM and other outreach events.

Presentations to stakeholders such as economic development entities, elected officials, Site Specific Advisory Board and frequent contact with various regional site stakeholders.

DOE Public Open Houses-May 2019 and November 2019

During grant year four, DOE EM PPPO and DOE PORTS led the coordination and roll out of two series of Community Open Houses in the four county area near the PORTS site. The purpose of the Open Houses was to inform the public at large about site cleanup and site reindustrialization efforts. Kiosks

included the Site Specific Advisory Board (SSAB), the community reuse organization-SODI, OU's PORTSfuture Program, and site cleanup contractors featuring asset recovery, onsite waste disposal facility, and workforce information. PORTSfuture attended the following events and displayed the interactive PORTS site concept planning and regional assets maps, economic impact and workforce analysis data, and general site reindustrialization vision-materials:

- May 8, 2020-DOE Community Open House at the DOE PORTS facility in Piketon, Ohio
- May 14, 2020-DOE Community Open House in Jackson, Ohio
- May 16, 2020-DOE Community Open House in Portsmouth, Ohio
- May 21, 2020-DOE Community Open House in Waverly, Ohio
- May 23, 2020- DOE Community Open House in Chillicothe, Ohio
- November 12, 2020-DOE Community Open House in Jackson, Ohio
- November 14, 2020 -DOE Community Open House in Waverly, Ohio
- November 19, 2020- DOE Community Open House in Portsmouth, Ohio
- November 21, 2020- DOE Community Open House in Chillicothe, Ohio

Various Meetings and Presentations Highlighting PORTSfuture Program to Elevate Site Cleanup and Site Reindustrialization Efforts Held During Grant Year 4 include:

Recent National/State/Regional Presentations To Elevate Program

- US DOE National Energy Technology Laboratory-Morgantown W.Va.-DOE FE research lab current focus on integrating hybrid power systems. Presented to NETL research team, attended international workshop at invitation of NETL.
- West Virginia University Energy Institute- leading the effort on storage hub and \$83.7B China Investment
- State of Ohio Economic Development Entities: JobsOhio and JobsOhio APEG
- Ohio Governor DeWine's southern Ohio rep.
- US Senator Sherrod Brown's southern Ohio rep.
- Congresswoman Marcy Kaptur's Congressional Liaison
- US DOE Headquarters
 - Office of Environmental Management task force leader focused on leveraging site assets in cleanup
 - Office of Fossil Energy Senior Advisors to Secretary Perry for Appalachian Petchem Initiative
- International Economic Development Council
- SSAB full board meeting
- Regional DOE Community Open Houses
- PORTSfuture is a member of the Energy Communities Alliance (ECA) and attends annual workshops
 - Also engage w select participants of the National Cleanup Workshop, ECA & EFCOG, Economic Dev Subcommittees
- National Science Academy's Geographical Sciences Committee on Energy
- Various private sector entities

The facility at Piketon, Ohio





Figure 9 Meetings and Presentations during Grant Year 4

Collaborations

DOE-Related Entities such as US DOE National Laboratories and Community Reuse

Organizations-The PORTSfuture Program connects with various experts at DOE National Laboratories and community reuse organizations to seek information to inform our program activities and to discuss PORTSfuture Program activities in support of DOE EM cleanup and preferred community future use. This past grant year, we had contacts with the National Energy Technology Laboratory, Savannah River National Laboratory, and the Community Reuse Organization of East Tennessee.

DOE FE and EM Appalachian Petrochemical Initiative

Ongoing discussions continue with the DOE Senior Advisors in Fossil Energy who are advancing an Appalachian Petrochemical Initiative that is focused on leveraging the current shale gas boom in eastern Ohio and Western Pennsylvania to create jobs in some of the poorest counties in the nation. PORTSfuture meetings and conversations with FE and EM are focused on elevating the PORTS site capacity for meeting the infrastructure needs for petrochemical industries. This would benefit EM as it would serve as an external driver to accelerate and complete the clean-up of PORTS. Contacts are ongoing with the Senior Advisor to DOE Secretary and Liaison with DOE Fossil Energy (FE), the Senior Advisor for DOE Fossil Energy (FE), the Leader of the Appalachian Petrochemical Initiative Task Force, and the Senior Scientist and EM Strategic Planning Support.

Energy Communities Alliance (ECA)

ECA is a non-profit, membership organization of local governments for communities that host, are near to, or impacted by U.S. Department of Energy activities. ECA convenes meetings and workshops for these entities to share information, discuss/establish policy positions, and promote community interests related to environmental, regulatory, and economic development needs/concerns and the specific impacts at the local level. Ohio University/PORTSfuture is a non-voting member of the Energy Communities Alliance and participates in conferences and national meetings held by ECA and utilizes materials disseminated by ECA to inform our grant activities.

PJM Interconnection, LLC

PJM is a regional transmission organization (RTO) and PORTSfuture discussions with PJM centered on grid capacity and potential grid and load studies for PORTS to help better identify PORTS viability as an electricity transmission and distribution hub. This included potential grid studies for placing a 1 GW CCGT at PORTS, which would have to be requested by a utility or independent power producer. Discussions occurred with the Executive Director of Strategic Policy and External Affairs who was formerly the chair of the Public Utilities Commission of Ohio (PUCO), PJM Infrastructure Planning, and PJM Interconnection Agreements staff.

Federal Deposit Insurance Corporation (FDIC)-Appalachian Economic Inclusion Roundtable with Financial Institutions

The Federal Deposit Insurance Corporation (FDIC) invited the Voinovich School to partner on a multi-state initiative to engage Appalachia on issues related to financial inclusion and empowerment. The first session was held in Grant Year 3 with approximately 30 executive-level participants attended the ‘by invitation only’ Athens event, representing non-profits, academic institutions, foundations and other community-based organizations that work on issues relative to Appalachia. The event focused on information gathering/identifying gaps in financial services in five key FDIC interest areas of financial inclusion.

The follow up session was held in Grant Year 4 with approximately 30 executive-level financial institution participants attending the event to discuss possible programming to address issues identified in the previous year’s session. The roundtable event held on June 18, 2019 in Athens, Ohio was organized by the FDIC Chicago Regional Office. The PORTSfuture Program provided staff support for planning and executing this initiative. FDIC staff attended from four regions that fall within FDIC’s Appalachian coverage area including Atlanta, Chicago, Dallas and New York. Roundtables were held in other Appalachian areas throughout the United States.

To develop the roundtable, the FDIC had briefing sessions with the following entities to inform their focus on identifying Appalachian financial issues: Appalachian Regional Commission; Federal Reserve Bank in Richmond Va.; Appalachia Community Capital; and Appalachia Funders Network.

FDIC will summarize the information from all events to identify areas in which the FDIC can play a role in partnering with an existing initiative or create a new FDIC initiative to address the one or two areas on which they will focus/invest.

National Energy Technology Laboratory (NETL) - Maintaining connection and exploring possible collaborations with the National Energy Technology Laboratory in Morgantown, West Virginia. The IES-CLM links to the research focus of this national lab and future opportunities to collaborate were discussed and will be pursued as applicable.

West Virginia University Energy Institute (WVUEI)- Maintaining connection and exploring possible collaborations with WVUEI, along with the National Energy Technology Laboratory (NETL) both located in Morgantown, West Virginia, to advance mutual goals related to attracting energy investment dollars to Appalachia (i.e. southern Ohio, Western Pennsylvania, and West Virginia). Several meetings and presentations have taken place with a commitment to continue to seek ways to work together when mutually beneficial.

Coal Research Center- Maintaining connection to one of the nation's leading academic energy research organizations developing innovative and responsible engineering solutions to issues surrounding domestic energy sources. From clean coal technology to alternative biofuels development, the energy research supports the long-term viability of both our energy resources and our natural environment.

Source: <https://www.ohio.edu/engineering/ohio-coal/index.cfm>

Alternative uses of coal in additive manufacturing could play a key role in the development and operation of an IES-CLM complex and contacts with Center's Director are ongoing.

Institute for Corrosion and Multi-Phase Technology- Maintaining connection to this Institute that researches new ways to address the corrosion of pipelines in partnership with a global gas and oil industry alliance. Pipelines will be a key infrastructure component for an IES-CLM complex and contacts with Center's Director are ongoing.

Shale boom and bust innovation team-A team of OU engineers and policy experts was awarded \$1.3 million from the competitive OU Innovation Strategy program to explore ways to keep more jobs and revenue from the energy industry in Appalachia and prepare the workforce and communities for life after the shale boom. Project activities include, in part, improved extraction/separation technologies, new tools to reduce pipeline corrosion and leakage, remote sensing technologies, wealth retention and economic development strategies for the region and supply chain analyses. The effort supports existing/new research at OU and the opportunity to leverage the activities with new partners.

Employing Ohio's abundant shale resources in additive manufacturing could play a key role in the development and operation of an IES-CLM complex and contacts with the Innovation Grant leaders are ongoing.

Biomass, bio-digesters, bio products, and co-production systems- Continue to collaborate with faculty researchers at Ohio University who are exploring opportunities for developing biomass, bioenergy and bio products coproduction systems that will simultaneously enhance ecosystem services. Biomass, bioenergy and bio products could play a key role in the development and operation of an IES-CLM complex and contacts with biomass, bioenergy and bio products researchers are ongoing.

Related OU academic departments-Engaging with faculty and researchers from economics, engineering, chemistry, public administration/public policy, etc...when applicable to advancing grant activities.

Ohio Education Resource Center (OERC) –Through other funding (i.e. non-DOE) the Voinovich School is a collaborator on the Ohio Department of Higher Education, Office of Workforce Transformation and the Ohio Department Job and Family Services team that is analyzing state workforce and education data to demonstrate supply and demand. This workforce database will inform higher education institutions on how graduates are faring in the workforce and the database will provide employers with information about Ohio’s supply of trained and educated workers. PORTSfuture will engage with OERC when applicable to advance grant activities.

Office of Research and Sponsored Programs- the Vice President for Research and Creative Activity and Dean of the Graduate College at Ohio University and the Director of OU Corporate Engagement and Industry Partnerships through the PORTSfuture grant have engaged with SODI and DOE to learn more about the site reindustrialization effort. These offices remain committed to providing support to the effort when possible, specifically with linking OU researchers to site reindustrialization efforts and assisting with developing industry partnerships.

OU Entrepreneurial Ecosystem (Small Business Development Center (SBDC), Procurement Technical Assistance Center (PTAC), TechGROWTH Ohio, OU Innovation Center, OU LIGHTS, and OU Tech Transfer Office)-provide expert entrepreneurial education, business assistance, and capital resources in support of small business development, procuring government contracts, and venture development in Appalachian Ohio and have provide specific services/events in partnership with the PORTSfuture grant to the DOE four-county area around the site as requested.

OHIO for Ohio-Ohio University is committed to educating students, improving communities and impacting the local, regional and statewide economies through six OU campuses and two OU regional centers around the State. OU has recognized the PORTS site reindustrialization initiative as an important priority for regional economic development in southern Ohio and numerous OU officials are providing input and offering insights to the activities of the OU DOE grant.

Workforce Development-OU continues to explore opportunities to support and devise regional workforce strategies for southeast Ohio and relevant adjacent counties. A regional approach is more market based, and creates scalable benefits and funding attraction to support better solutions. These efforts are led by Mike Zimmer Esq. who is an Executive in Residence at Ohio University.

Research conducted and presented at OU/DOE grant quarterly meetings by Mike Zimmer shows that this approach frames an Ohio River Valley workforce that strategically positions the region to attract large-scale economic development initiatives that are not limited by state boundaries. Research shows 20%-40% of workers may commute across state lines based on project or industry sector. The goal is to use workforce pilots with lifecycle outcomes to measure worker skills to jobs, gaps and training, existing plus new training resources, and post-performance goal evaluations by worker in key locations such as the Piketon area.

Initial focus is on energy jobs, skills required, career paths, retention practices for blue collar, green collar, and white-collar positions and workforce needs in region. Jobs of the future include skills development for demands in advanced and additive manufacturing, construction management, transportation and driving, warehousing/ logistics, algorithms, automation, coding, building O&M, customer service and experience, environmental tech, waste management, healthcare, fitness & wellness and professional services, accounting, and financial support.

Technical capacity with corrosion control occupations can be explored with OU’s Russ College of Engineering and Technology, Edison Welding Institute, and the Ohio Manufacturers Association. OU, SODI and other partners would lead the Ohio side of this Ohio River Valley workforce initiative.

Current activities include exploring funding sources collectively from ARC Power Grants, Department of Labor, or Manufacturing Extension Partnership of SE Ohio. This initiative could eventually seek partnership support from the Midwest Governors Association, Fluor, B&W, AEP, Ohio Manufacturer's Association, SODI, labor unions, relevant community colleges, and integrating with JobsOhio Ohio Southeast business assistance organization.

Additionally, by invitation, PORTSfuture continued to attend the Ohio Manufacturers Association Appalachian Ohio Manufacturers Workforce meetings focused on discussing how industry sector partnerships can assist with economic and workforce development in Appalachia Ohio. At the request of OMA, PORTSfuture also consulted with OMA on the possibility for OMA to develop a southeast Ohio manufacturing council in the future and discussed opportunities for PORTSfuture to provide support for that effort.

National experts and thought leaders

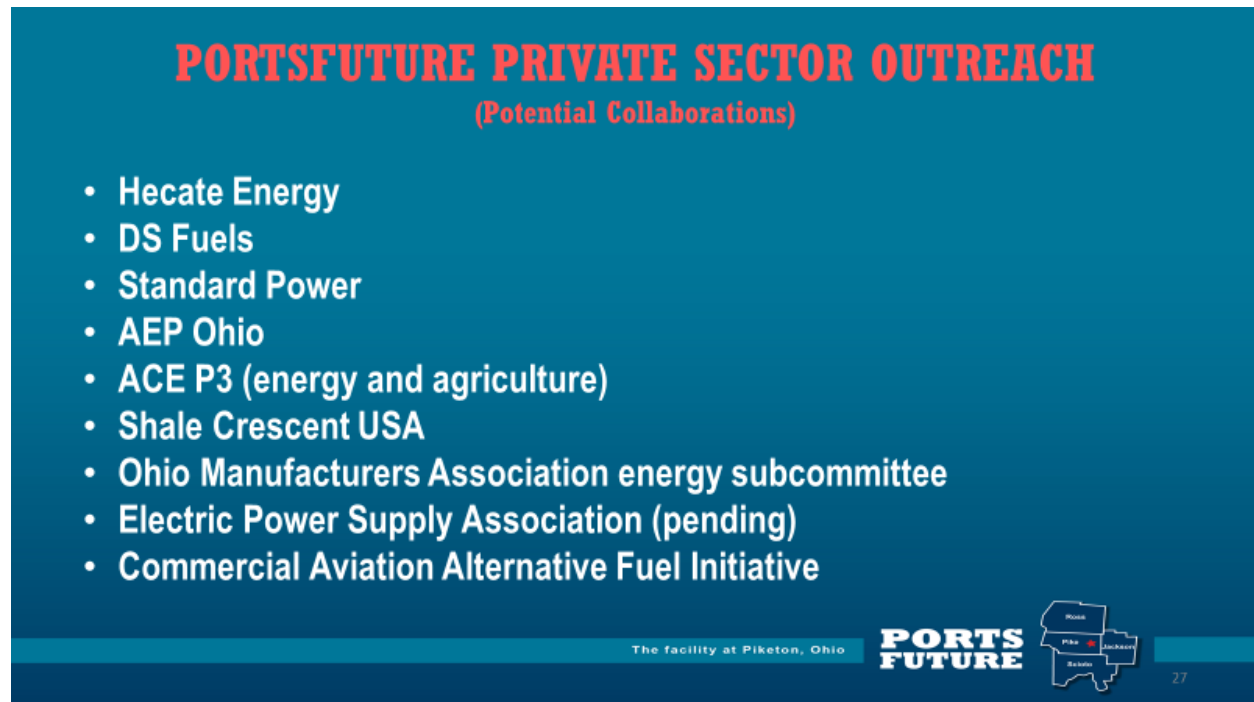
Ohio University's PORTSfuture grant leverages and incorporates University resources and relationships by engaging well-respected national experts and thought leaders in our grant activities. These august individuals provide valuable guidance and feedback to our work and raise the visibility of efforts to repurpose the facility. The following serve in an ongoing and/or in-depth consultative capacity to our site repurposing and ongoing technical assistance, public outreach, education, and engagement for property transfer and future use grant activities:

- Mike Zimmer Esq.-Attorney/International Energy Business Development expert and Ohio University Voinovich School and Russ College of Engineering and Technology Executive in Residence.
- Dr. Benjamin Cross P.E.-Founder and CEO of NuSynergy Energy LLC and an Ohio University Voinovich School Executive in Residence, formerly with Savannah River National Laboratory.
- Jeff Finkle-President and CEO of the International Economic Development Council (IEDC) and Ohio University Voinovich School Appalachian New Economy Partnership Fellow.
- Dr. Mark Weinberg-Dean of the Voinovich School of Leadership and Public Affairs at Ohio University
- Rob Painter-Senior Executive in Residence at Ohio University Voinovich School. Rob is an OU alum with an incredible career in the field of GIS/Data/Cyber and also venture capital including working for the government, CIA, Google, and other endeavors. He can advise/assist grant efforts based on his connections in federal, defense, data, and technologies spaces with a specific interest in exploring using the site as part of a national energy security strategy and as a possible site for a government data center, Midwest operations center, or other private sector data centers.
- Dr. Joe Shields-Vice President for Research and Creative Activity and Dean of the Graduate College at Ohio University.
- Dr. Kevin King-Director of Corporate Engagement and Industry Partnerships at Ohio University.

- Dr. Greg Browning-President of Capital Partners. Former Ohio University Board of Trustee. Former Director of the State of Ohio Office of Budget and Management and former Senior Policy Advisor to Governor George V. Voinovich.
- David Pidwell P.E.- Member of Ohio University Board of Trustees, Ohio University Foundation Trustee and Russ College of Engineering and Technology Board of Visitors.
- Richard Dickerson P.E. - Ohio University Foundation Trustee and Ohio University Russ College of Engineering and Technology Board of Visitors.

Industry Discovery and Networking

Ohio University participates in (at times with SODI and DOE) exploratory/opportunity meetings/informational meetings on an ongoing basis to identify entities/resources that could contribute to moving the IES-CLM complex and PORTS site reindustrialization initiative forward. Some of the entities/organizations that have been engaged and with whom ongoing contact exists include:



PORTSFUTURE PRIVATE SECTOR OUTREACH
(Potential Collaborations)

- Hecate Energy
- DS Fuels
- Standard Power
- AEP Ohio
- ACE P3 (energy and agriculture)
- Shale Crescent USA
- Ohio Manufacturers Association energy subcommittee
- Electric Power Supply Association (pending)
- Commercial Aviation Alternative Fuel Initiative

The facility at Piketon, Ohio

PORTS FUTURE

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Figure 10 Private Sector Outreach Grant Year 4

Shale Crescent USA

Shale Crescent USA's website states, "The mission of the Shale Crescent U.S.A. economic development initiative is to encourage business growth in the Mid-Ohio Valley based upon low natural gas prices that allow manufacturers to operate more efficiently while producing products more economically with access to water and half the population of the United States and Canada. Shale Crescent USA is made up of business leaders, regional economic development partners, non-profit and non- governmental agencies, area Chambers of Commerce, utilities, financial and educational organizations throughout Ohio, West Virginia and the Mid-Ohio Valley." Source: <http://shalecrescentusa.com/about-shale-crescent-usa.html>

PORTSfuture has ongoing contact with Shale Crescent USA to discuss synergistic opportunities between OU initiatives and their efforts to create value-added manufacturing opportunities in southern Ohio with shale resources. This would expand industry, create jobs, and retain the shale wealth in Ohio. Synergies exist as shale gas would be a key feedstock for a variety of industries that would be a part of an IES-CLM complex and Shale Crescent USA will continue to be a resource for the IES-CLM complex effort as it develops.

JobsOhio and Appalachian Partnership for Economic Growth (APEG)-Recently Rebranded to Ohio SE

Through JobsOhio, the State of Ohio has six network partners throughout the state focused on economic development efforts for their assigned geographic region. The Appalachian Partnership for Economic Growth (APEG) has recently rebranded and changed its name to Ohio SE. This entity is the southern and eastern Ohio state economic development partner that serves 25 rural counties. These JobsOhio network partners serve as a visible point of entry for site selectors and industries interested in locating operations in Ohio. JobsOhio and Ohio SE strive to attract new companies to the region and expand existing companies in order to grow jobs and create wealth in southern and eastern Ohio. Ohio SE recently hired a new President and CEO and PORTSfuture and SODI are establishing a productive working relationship in order to elevate awareness of the PORTS site and site assets to the state level to advance site reindustrialization goals.

ACE P3 Educational Foundation, Inc.

ACE P3 describes their focus as follows: “The Alternative Clean Energy P3 (ACE P3) facility, which will be owned by the Foundation, will be a commercial scale coal-to-liquids operation that chemically converts coal into clean fuels or chemicals, without burning it, through a process called gasification. The common pollutants of coal combustion are not created during this process, which results in different combinations of carbon monoxide and hydrogen, or syngas. The syngas is then further processed into clean transportation fuels or other chemicals such as fuel substitutes for industrial boilers; steam and electricity for power generation; hydrogen; methanol; ammonia; transportation fuels such as diesel, jet and gasoline and synthetic natural gas.” Source: West Virginia Executive Magazine Fall 2016.

ACE P3 is now expanding their mission to include utilizing biomass or Municipal Solid Waste (MSW) as a feedstock for their gasification operations described above. ACE P3 also intends to co-locate indoor farming operations that would capture and utilize the CO₂ from the gasifier operations as the heat source for indoor farming units and has a pilot aquaponics facility online in Vienna, West Virginia in collaboration with Ohio Valley University (OVU). OU, SODI, ACE P3, and OVU meet or have regular conference calls to update each other progress of mutual interest and seek opportunities to collaborate with the end goal of siting an MSW gasifier project at PORTS that could eventually produce low-carbon jet fuel for the commercial aviation industry. OU has brokered conversations between ACE P3 and the Commercial Aviation Alternative Fuel Initiative (CAAIFI) to further develop this opportunity. The group is also exploring co-locating indoor farming units near the gasifier facility as another economic diversification opportunity for the region near the PORTS site.

Ohio Conservative Energy Forum- This group is a 501(c)3 public policy, non-profit that is focused on promoting an all-of-the-above energy strategy with an emphasis on renewable energy development around the state. They strive to broaden support for renewable energy to conservative voters/policy makers by educating/informing on the economic, workforce, and tax base benefits of developing renewable energy projects in Ohio. They are interested in the PORTS IES-CLM complex progress as the co-location of energy production and energy consumption (for manufacturing) is of great interest to them

as well. They also have an interest in energy policy and its impacts on growing renewable energy around the state. We can keep them in mind as potential collaborators for the future as appropriate.

Domestic Synthetic Fuels (DS Fuels)-PORTSfuture reached out to DS Fuels who are siting coal gasification via direct liquefaction of coal for the purpose of creating jet fuel. DS Fuels has purchase property in Mason County, West Virginia about 60 miles from the PORTS site. DS Fuels invited PORTSfuture and SODI to Mason County to present on the PORTS site reindustrialization potential to approximately 17 industry and political stakeholders in West Virginia. Following that presentation DS Fuels became interested in siting a larger facility at PORTS. A site tour and meeting was held and conversations will be ongoing.

Cielo-Trash to Fuel- PORTSfuture reached out to Cielo to learn more about their operations. Based in Canada and focused on expanding in Canada and USA and looking to develop 40 partnerships and facilities in the next 3 or so years. Their model is superbly aligned with the PORTS IES-CLM concept and they are all in on the approach related to closed-loop/integrated systems. Cielo is on a 3 to 4 year ramp up/expansion time and they are very interested in keeping in contact with us on the site as an opportunity for one of their projects.

Endless Sky L3C

Endless Sky L3C mission is to advance innovative and sustainable food production and they describe their focus as developing “.... new paradigms in growing, processing and marketing healthy food based on locally grown and processed crops, from human-scale prosperous farms that grow sustainably 12 months a year, while reducing the agricultural footprint and reducing pollution, energy use, and waste, all while making a positive contribution to the environment. ‘GrowHouses’ will also produce cut flowers and be growers of plants for nutraceuticals, bio-chemicals & pharmaceuticals”. Source: Endless Sky L3C fact sheet.

Grow houses could be cited outside of the PORTS reservation and serve to create jobs in the region and grow fresh food for the southern Ohio region especially for local grocers, hospitals, nursing homes, schools, and restaurants. Synergies exist and contact with Endless Sky will continue as the IES complex effort develops.

NextGen

NextGen partners with Endless Sky on the waste/power/biochemical side of Endless Sky’s projects. NextGen is “... a green power development company, formed by project finance professionals with deep experience in major Asian and American markets. Headquartered in Singapore, NextGen’s current projects include greenfield project development, with initial projects in Singapore and feasibility studies in Thailand and Indonesia. Their primary focus is low emissions waste-to-energy and biomass power projects.” Source: Endless Sky L3C fact sheet.

NextGen has expressed two areas of interest in possibly utilizing the site assets and infrastructure. Source: conference calls between Ohio University and NextGen principal:

- “Pilot Biomass Facility in Piketon – 1 MW biomass power facility in Piketon, with waste heat used to support an indoor farming unit. Miscanthus grass, grown as close as possible to the Piketon site would be used as feedstock. NextGen would sell the electricity to the grid operator under the Public Utilities Regulatory Policy Act’s mandatory sales provisions at the market rate, and receive additional income through the sale of Renewable Energy Certificates to (their) Washington area customers.
- Carbon Negative Innovation Center/Green Cement – The 1 MW biomass power facility will also act as one of the Carbon Negative Innovation Centers NextGen is establishing at different locations. (They) plan to work with a carbon capture and use partner, with technology capable of diverting

carbon emissions from the power facility stack, and permanently sequestering the carbon in “green cement” and other building materials. This will result in carbon negative electricity, since the energy crops pull carbon from the atmosphere and it will not be emitted back into the atmosphere by the power facility.”

NextGen’s focus is on green power development and waste/power/biochemical processes. Synergies exist with an IES-CLM complex and discussions are ongoing.

Hecate Energy

OU, SODI and DOE hosted a site tour and met with this business in the past to discuss synergistic opportunities between an IES-CLM complex and their sustainable energy production efforts. Hecate Energy is currently pursuing a large solar farming and solar panel manufacturing initiative that could be sited in the Pike/Scioto/Lawrence Counties region. This solar initiative is currently pending final approval from the Public Utilities Commission of Ohio (PUCO). Synergies exist with their efforts and contact with Hecate Energy continues as the IES-CLM complex effort develops. Discussions are ongoing.

American Electric Power (AEP) Ohio

PORTSfuture has had continuous contact with AEP Ohio’s economic development office to keep them informed of site reindustrialization efforts and to explore synergies and possible collaborations as our grant industry discovery work for SODI continues.

Ohio Manufacturers’ Association (OMA)

The Ohio Manufacturers’ Association is a member organization comprised of a vast array of industries. OMA focuses on protecting and growing Ohio manufacturing endeavors throughout the State of Ohio. Ohio University was invited to present an overview of the DOE grant project to the Ohio Manufacturers’ Association Energy Committee and to discuss the IES-CLM complex’s closed-loop manufacturing concept in 2017. Members were very supportive of the IES-CLM complex concept because closed-loop manufacturing would greatly help industries in driving down the costs of manufacturing as well as ensuring a reliable and affordable source of energy for their production processes. Synergies exist and contact with OMA is ongoing. During Grant Year 4, OMA has invited PORTSfuture to participate in efforts to organize a southeast Ohio workforce initiative and has asked PORTSfuture to collaborate with OMA and Shawnee State University with developing a southeast Ohio industry council. PORTSfuture has invited SODI to be a part of both the workforce initiative and the industry council development.

Out of state company-PORTSfuture reached out to an out of state company after meeting their CEO at an OMA meeting to discuss the potential for the PORTS site to serve as a location for their large-scale data processing centers for cryptocurrency markets. This company has interest in developing “Data Cities” that integrate IT systems to support data warehouse, data centers, crypto-mining, artificial intelligence, and other operations that require massive computational capability. The company has purchased several hundred acres in Coshocton Ohio for such an operation. A PORTS site visit and meeting was set up with the company, OU, SODI, and DOE to discuss their interest in the SODI parcels. The company is currently reviewing much of the high-quality PORTSfuture data, GIS, and other summary materials related to the site in their process to determine their interest in the site.

Summary and next steps

Ohio University is honored to remain a part of, and to continue to add value to, DOE, SODI, and site contractor collaborative efforts on informing end-state configuration to support viable site repurposing, ultimately resulting in cost savings/cost avoidance and reducing the EM footprint at PORTS. The activities executed under the *Site Repurposing Continuation and Ongoing Technical Assistance, Public Outreach, Education, and Engagement for Property Transfer and Future Use* activities created public

value and served the public interest by informing site cleanup and future use planning, while being mindful of leveraging the existing public assets of the PORTS site and the region to create regional economic stability.

The activities and information cited in this report serve to advance SODI's goal to develop an Integrated Energy System-Closed Loop Manufacturing (IES-CLM) complex at the site. It is important to stress that these activities were carried out in a manner that was responsive to the stated future-use preferences of the public at large in the four county region near the site as identified during various DOE and Ohio University public engagement efforts and with the involvement of numerous site stakeholders including: SODI; Site Specific Advisory Board (SSAB); community-at-large; local, state, and federal elected officials; county, regional, and state level economic development officials; private sector interests; and national experts.

Ohio University remains committed to building on the momentum gained to continue these vital activities with DOE, SODI, the SSAB, and site contractors. DOE, SODI and OU have identified the following areas in which Ohio University can continue to add value. Additional details for some of these activities are presented in the Grant Year 5 Work Plan. Proposed future activities include:

- Continuing to carry out work depicted in the OU Current Grant Activities graphic shown earlier in this report in Figure 1.
- Continue to identify IES-CLM complex industries and related industry needs to support expansion in the region and/or at the PORTS site. Conduct targeted industry site infrastructure analysis to inform sequencing for D&D including conducting a comparison of current site conditions versus conditions needed to support commercial use in specific targeted industry sectors to inform DOE decisions on property transfer.
- Viable clusters for future development that have been identified included energy, advanced manufacturing, and transportation/logistics. Convene roundtables when requested by SODI to focus on developing Public Private Partnerships for Advanced Manufacturing and Transportation/Logistics Sectors.
- Identify siting requirements such as utilities and other assets to be left in place resulting in cost avoidance for DOE. Utilize GIS to display information when appropriate.
- Upon request and with the approval of DOE, update the utility matrix and permit inventory-The utility matrix provides an at-a-glance view of utilities' current capacity, current usage, excess capacity, and other notes of importance for industries looking to site operations at PORTS. This could serve to identify assets to preserve rather than demolish, resulting in the potential for DOE cost avoidance in this effort. Incorporate the management of site ecological assets/natural capital assets management as appropriate. The use of this matrix is subject to DOE discretion.
- Develop and assist with the execution of a site repurposing implementation plan and SODI Resource Manual as requested/as appropriate and incorporate Federal Programs as appropriate.
- Site Services Agreements- work with DOE PORTS and site contractors to develop site services agreements to facilitate and streamline new businesses' ability to access needed site services when locating on parcels transferred to SODI for site reindustrialization.

- SODI Website Launch and Positive Public Information Campaign-Collaborate with SODI to promote the website and available transferred parcels to audiences that include industry prospects, businesses, nonprofits, economic development professionals, and general inquiries.
- Property Requests Response Guidelines-In collaboration with SODI, develop tools/templates for requests for property. This includes SODI requests to DOE for property and includes private sector request to SODI for property.
- Produce data and GIS needed to support these efforts (e.g. this may include maintaining existing data dashboards, GIS products, creating profiles of regional economies-and/or other data to be determined).
- Conduct economic impact analysis, workforce analysis, and other types of data analysis for IES-CLM related industries.
- Assist SODI in developing and executing a financial plan to increase SODI's capacity to obtain the resources necessary to transform PORTS into an Integrated Energy Systems-Closed Loop Manufacturing (IES-CLM) complex and to pursue complementary missions and facilities.
- Continue to identify and engage external and/or private sector resources that could be interested in utilizing site assets for future business development and job creation in the region.
- Develop a public information initiative utilizing regional and national influencers and thought leaders to articulate the value of the PORTS site for economic development and elevate the visibility of the site reindustrialization efforts.
- Continue and/or expand Science, Technology, Engineering, and Mathematics (STEM) enrichment activities designed to encourage regional students to learn about and engage in activities in STEM disciplines with the goal of encouraging students to pursue careers in these in-demand fields that provide well-paying employment opportunities.
- Continue to expand existing partnerships and develop new partnerships to advance site reindustrialization efforts.
- Continue to disseminate program information through websites, presentations, news releases and/or conferences as appropriate.
- Continue to inform and update key regional and political stakeholders on activities and progress.
- Leverage other funding opportunities where possible and especially pursue opportunities to bring private sector dollars and/or public private sector partnerships to the PORTS site,
 - This includes building upon current initiatives with entities such as:
 - commercial partners interested in exploring opportunities at the site
 - university partners interested in conducting RD & D in advanced energy/renewable energy endeavors at the site, and
 - technology commercialization experts, private sector venture capitalists and pre-seed fund resources interested in investing in Southern Ohio companies.
- Other activities will be defined in collaboration with program partners.

The diagram illustrates the IES Technical Concept (1 of 3), showing a complex industrial process flow. Key components and streams include:

- Fluidized Bed Boiler:** Receives inputs of NG, Syngas(CO), MSW, Tires, and Biomass. It produces Exhaust Gas (CO_2 , H_2O , NO_x) and Solid Residue.
- Gas Turbine:** Receives AIR and NG. It produces Electricity and Exhaust Gas (CO_2 , H_2O , NO_x).
- Duct Burner:** Receives Exhaust Gas from the Gas Turbine and AIR/NG. It produces Electricity and Exhaust Gas.
- Heat Recovery Steam Generator (HRSG):** Receives Exhaust Gas from the Duct Burner. It produces Steam and Exhaust Gas Recovery.
- Economizer (Pre-heater):** Receives Steam from the HRSG and produces a stream labeled 8.
- Deaerator & Feedwater Heater:** Receives Steam from the HRSG and produces Demineralized Water.
- Water Treatment:** Receives Make-up Water and produces Demineralized Water.
- Steam Turbine:** Receives Steam from the HRSG and produces Electricity.
- Condenser:** Receives Steam from the Steam Turbine and produces Condensate Return.
- Steam Methane Reformer (Un-fired):** Receives NG and produces H_2 , CO_2 , and CO (Syngas).

Streams are labeled with numbers 1 through 10, indicating specific points in the process flow.