

**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 April 1, 2017 – March 31, 2018**

***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 tasks contributed to 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 with information sharing and partnership building; 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; and national experts.

The work is part of the Ohio University PORTS future grant that focuses activities in the areas of public engagement, training, outreach, and STEM education; ecology, hydrology, site environment field work; and economic modeling/economic impact analysis. 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; facilitating the transfer of property; leveraging public assets of the PORTS site and the region to create regional economic stability; and providing regional STEM education opportunities related to the site.

## **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 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 which included interviewing key site stakeholders, conducting four focus groups for 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 which 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. To view the full outreach report please visit:

<http://www.portsfuture.com/Default.aspx>

Public voting on future use preferences occurred online and in-person at public events in 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:

<b><u>Scenario Name</u></b>	<b><u>Total Votes</u></b>
<b>Nuclear power plant</b>	<b>495</b>
<b>Green energy production</b>	<b>475</b>
<b>Industrial park</b>	<b>421</b>
<b>National research and development</b>	<b>418</b>
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 about the site. These results served to inform all site repurposing activities.

### **Site repurposing activities evolution and current focus**

#### **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 approached 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 which include energy, advance manufacturing, and transportation/logistics. The IEDC President continues to provide expert input and guidance to grant activities throughout the year as requested and in person two times 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. Following the Energy Sector Roundtable, the key insights regarding most feasible energy industries to pursue included: bio-chemicals (polymers, plastics, other); waste recycling/waste transformation (waste heat, municipal waste, anaerobic digestion, methane combustion, other); energy creation, energy storage and micro-grids; biofuels/bio-products; and coal alternatives (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 Esquire-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:  
[http://www.portsfuture.com/\(Editor\)!78/PORTSfuture%20Energy%20Sector%20PORTS%20Campus%20White%20Paper.pdf](http://www.portsfuture.com/(Editor)!78/PORTSfuture%20Energy%20Sector%20PORTS%20Campus%20White%20Paper.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 to be a prerequisite for enhancing the viability of locating an Integrated Energy System (IES) 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-present

Current site repurposing activities were informed by and build 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 are focused on supporting the development of an Integrated Energy System (IES) complex/closed-loop, advanced manufacturing complex at PORTS and aligns with insights garnered throughout previous site repurposing grant work. An IES 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 being employed based on the notion that clusters develop across a geographic area and businesses provide synergy across/among each other which enhances cluster growth. This cluster approach was consistent with stated public preferences for site reuse cited above. 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, and transportation/logistics, and thus enhance the economic viability of the region.

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; a proposal protocol for property transfer requests; and providing STEM educational activities 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 21<sup>st</sup> century industries with enduring missions. This will provide residents in the region access to 21<sup>st</sup> 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. Current OU grant activities are depicted in Figure 1 below.

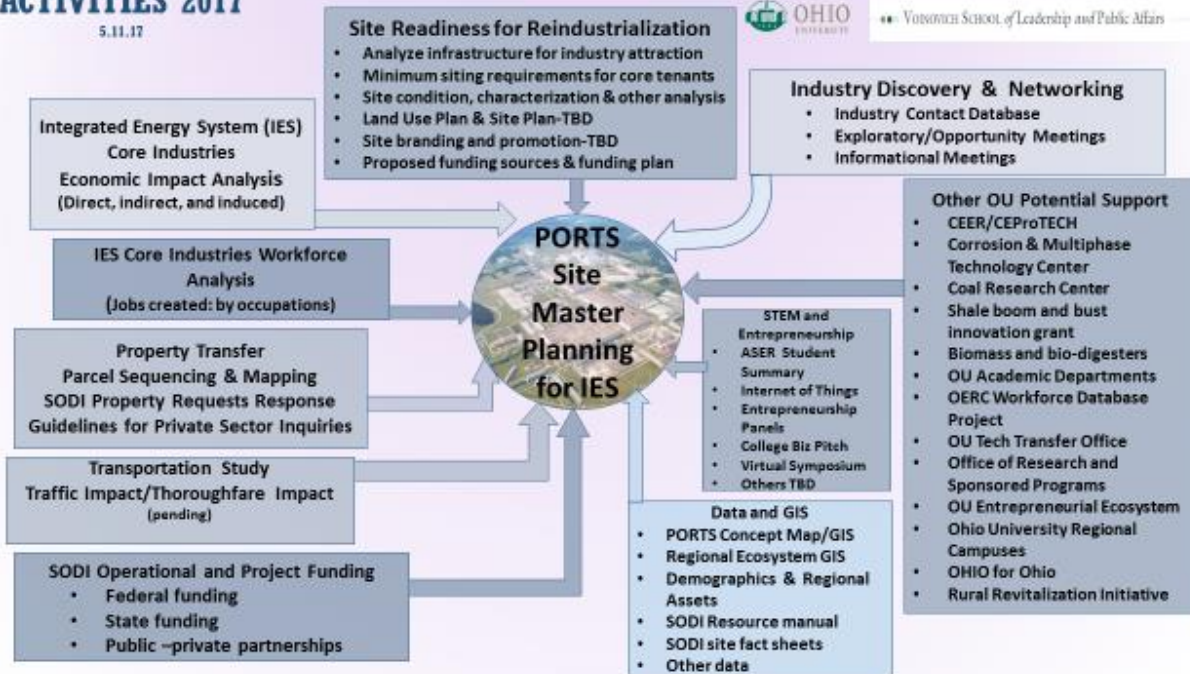


Figure 1-OU current grant activities

### Integrated Energy System (IES) complex

The Southern Ohio Diversification Initiative is pursuing the development of an Integrated Energy System (IES) complex at PORTS in order to fully leverage the unique infrastructure and other assets of the site 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 together 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 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, 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 can be achieved. An IES results in industrial symbiosis as depicted in Figure 2 below.



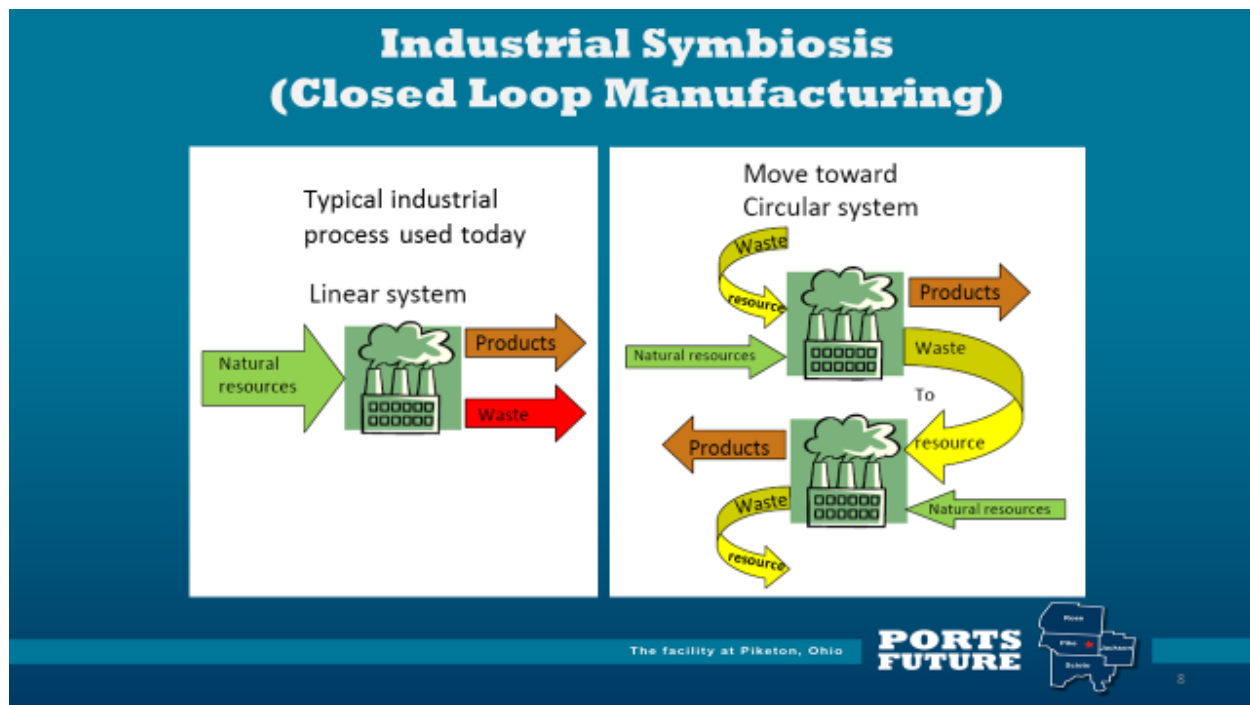


Figure 2-Industrial symbiosis depiction

IES complexes integrate high temperature heat with industrial technologies to: produce electricity; 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. Creating an IES 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 process plant; 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 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 concept follows in Figure 3 below. To view the Integrated Energy System complex technical concept diagrams, see Appendix 1.

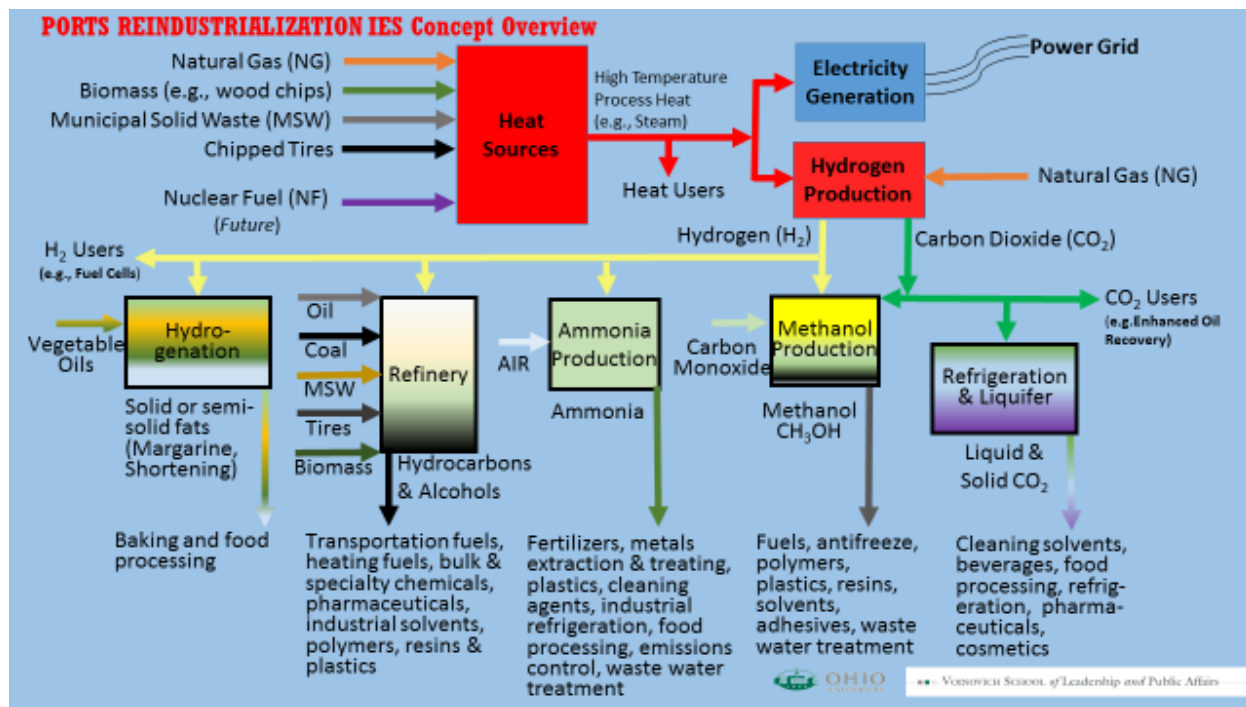


Figure 3-Integrated Energy System Concept Overview graphic

Regional cluster development will occur with the growth of natural spin-offs from the core IES complex to be located at the former PORTS facility as various industries can realize more effective production costs when tied into an IES. 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 complex at the PORTS facility. Other industries can tie into the IES 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 complex follows in Figure 4 below.



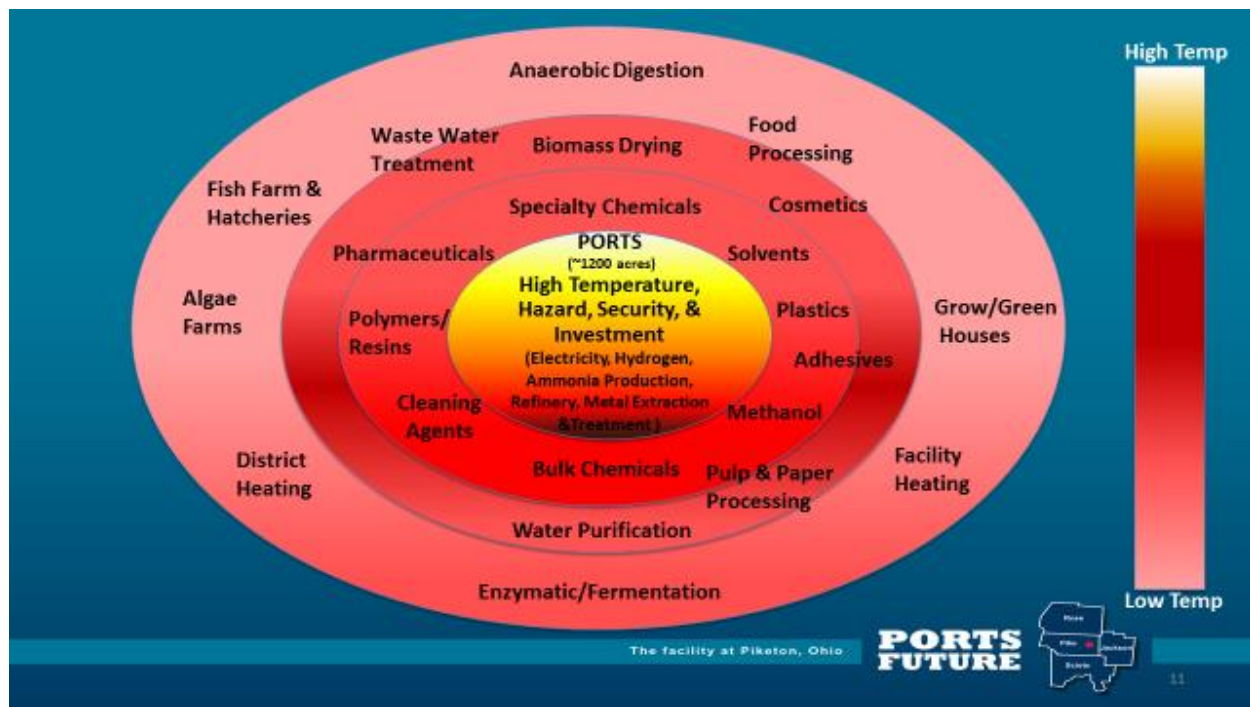


Figure 4- Potential for regional cluster development with an IES complex

Reindustrialization of the PORTS site into an IES complex would serve as an exemplary 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 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 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 21<sup>st</sup> 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 healing 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. 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 complex benefits are shown below in Figure 5-IES Impact.

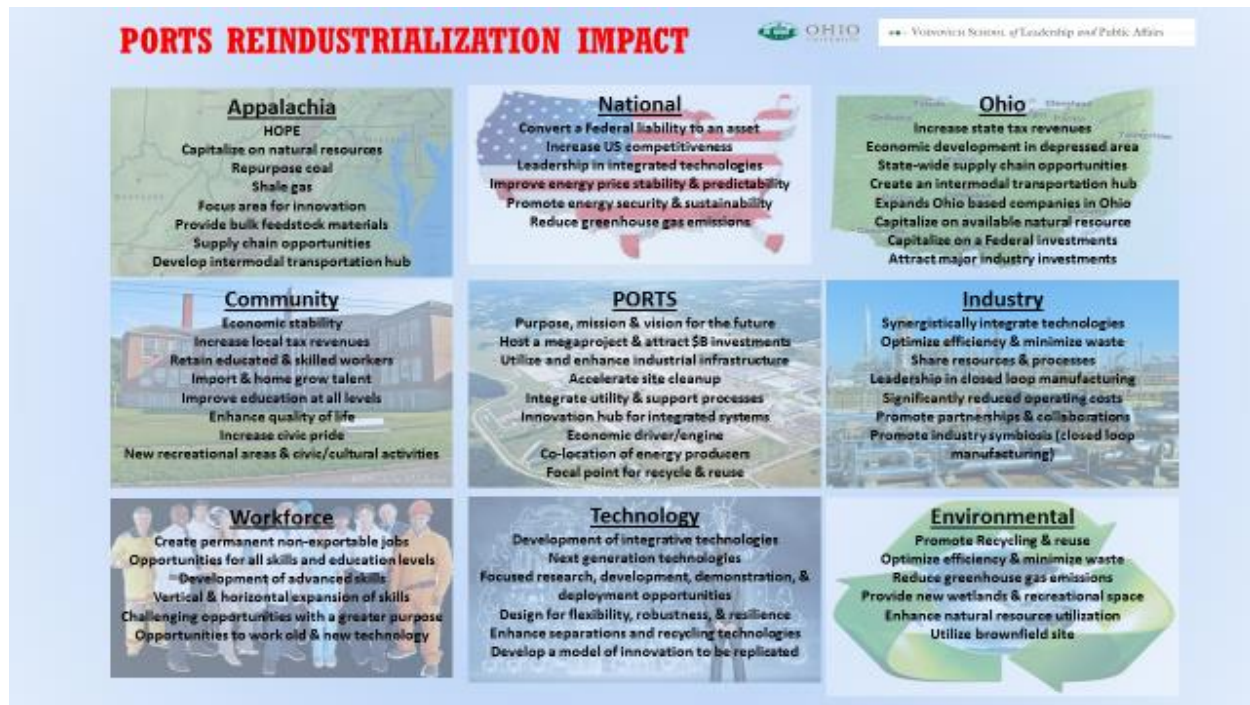


Figure 5-IES Impact

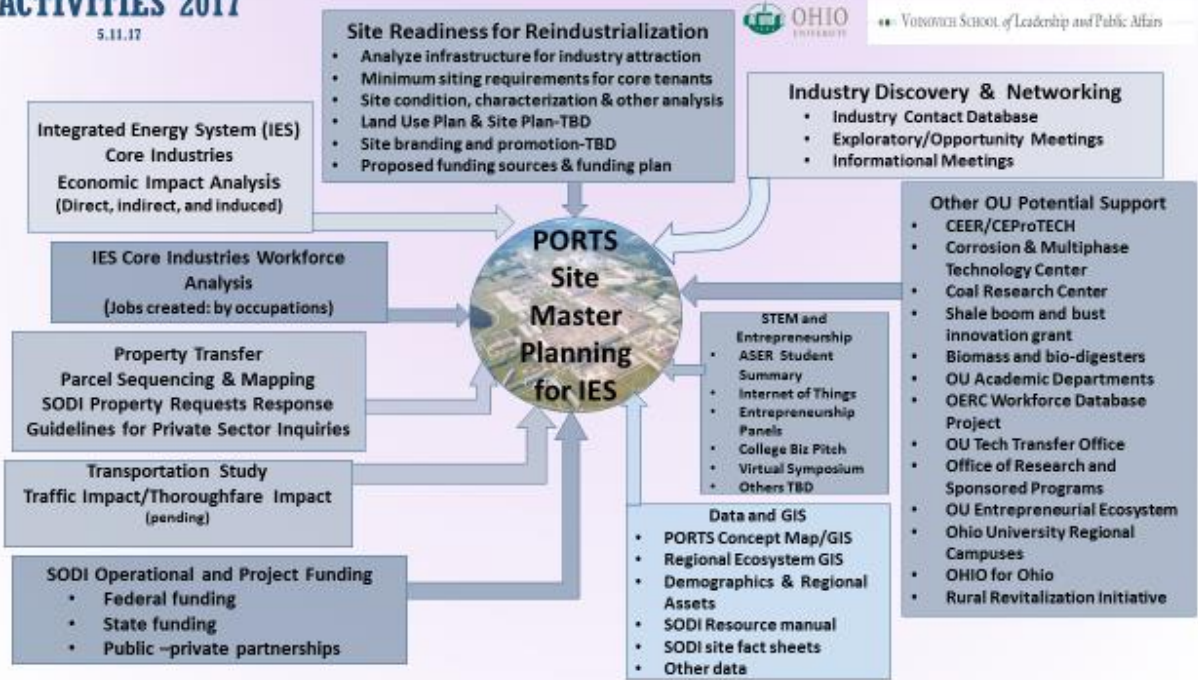
OU grant activities complement SODI's ongoing collaboration with the Next Generation Nuclear Plant (NGNP) Industry Alliance. SODI and NGNP are exploring an international public-private partnership focused on identifying and piloting a versatile next generation nuclear power technology at the PORTS site. The next generation nuclear reactor could serve as the long-term source of high temperature heat to power the IES 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. SODI and the NGNP Industry Alliance are partnering with the members of the European Union (EU) based Nuclear Cogeneration Industrial Initiative (NC2I) on a trans-Atlantic effort for piloting next generation nuclear technology. Such an initiative will need the buy-in and backing of both US and EU select government officials and industry leaders in order to develop a committed partnership. Key concerns that must be addressed include mitigating the immense up-front cost to construct the reactors both here in the US and in the EU 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 complex at the PORTS site. SODI and the NGNP plan to continue to working closely with potential key collaborators in industry, government, the U.S. Department of Energy and others with the goal of effectively fostering this partnership.

**Summary of current and ongoing grant activities for Site Repurposing Continuation and Ongoing Technical Assistance, Public Outreach, Education, and Engagement for Property Transfer and Future Use**

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

## ACTIVITIES 2017

5.11.17



### Master Planning Activities (State Capital Budget funds)

The community reuse organization, SODI, operates within a limited budget and has limited staffing capacity to carry out their various functions. In consultation with SODI, Ohio University had pledged to leverage a portion of our DOE grant funds to pursue the attainment of \$250,000 in State of Ohio Capital Budget planning dollars to enhance SODI's site reindustrialization efforts. The Ohio General Assembly and the Governor of Ohio approved our request for these funds in the 2017-2018 State Capital Budget. Due to the requirement within State Capital Budget funds related to obtaining a joint use agreement for the DOE facility for a period of seven years, the Ohio Department of Higher Education and the Ohio Office of Budget and Management could not determine a mechanism to grant the release of these funds to Ohio University since Ohio University would not be utilizing the DOE facilities and infrastructure. To remedy this barrier, Ohio University revised the original proposal and designated SODI as the grantee for these funds as SODI is able to execute a joint use agreement with DOE for a period of seven years. Ohio University submitted a request to the Ohio General Assembly to re-appropriate the \$250,000 that was awarded to Ohio University to instead be awarded to SODI for State Capital Budget years 2019-2020. This request is still pending with the Ohio General Assembly. The SODI activities within the legislative request will leverage Ohio University's DOE grant activities.

State Capital Budget planning dollars will help support and expedite site reindustrialization by providing resources to assist the Southern Ohio Diversification Initiative (SODI) with expanding and expediting asset recovery operations which 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 as asset recovery proceeds are used by SODI for economic diversification initiatives in Pike, Ross, Scioto, and Jackson counties. These proceeds are also used to accelerate the PORTS site reindustrialization efforts including working with Ohio University 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 limited to cleanup (D&D) activities only. These expanded asset recovery and site reindustrialization planning



dollars would separately support the reindustrialization of the site to capture continuing and permanent use of the infrastructure left behind.

State Capital Budget funds will support planning for site reindustrialization preparedness activities to prepare parcels to be made available and undergo approval processes for reindustrialization including: identifying industry types that would be a good fit for the facility and ensure 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 to the site. SODI will begin to receive land parcel transfers in 2018 and thus SODI needs to accelerate site reindustrialization preparedness so that industries can be attracted quickly so that job creation can be realized for the region.

### **Integrated Energy System (IES) Industries Economic Impact Analysis**

Ohio University will analyze the direct, indirect, and induced economic impact 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. Core industries associated with an IES complex were analyzed in the previous grant year and can be viewed at:

[http://www.portsfuture.com/\(Editor\)!78/Economic%20Impact%20Analysis%20for%20IES%20Complex%20at%20PORTS\\_December%2019%202017.pdf](http://www.portsfuture.com/(Editor)!78/Economic%20Impact%20Analysis%20for%20IES%20Complex%20at%20PORTS_December%2019%202017.pdf)

The tier 2 industries economic impact analysis report will serve to inform site reindustrialization, local economic development planning efforts and workforce development strategies and will also serve to inform the IES 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 complex.

Deliverables will include brief summary documents that can stand alone and be compiled as part of a larger summary document.

Draft electronic version of report in PDF format-target date-April 30, 2018

Final electronic version of report in PDF format-target date-June 30, 2018

### **Integrated Energy System (IES) Industries Workforce Analysis**

Ohio University will analyze the workforce skills and experience that will be needed by additive manufacturing/tier 2 industries associated with an IES complex. Core industries workforce needs associated with an IES complex were analyzed in the previous grant year and can be viewed at:

[http://www.portsfuture.com/\(Editor\)!78/Workforce%20Analysis%20for%20Proposed%20IES%20Complex%20at%20PORTS.pdf](http://www.portsfuture.com/(Editor)!78/Workforce%20Analysis%20for%20Proposed%20IES%20Complex%20at%20PORTS.pdf)

The tier 2 industries 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 complex and will serve to inform the IES 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 and be compiled as part of a larger summary document.

Draft electronic version of report in PDF format-target date-April 30, 2018

Final electronic version of report in PDF format-target date-June 30, 2018

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

### **Property Requests Response Guidelines**

At the request of site stakeholders, Ohio University will develop in collaboration with SODI 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.

### **STEM Activities**

Science, Technology, Engineering, and Mathematics 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. PORTSfuture STEM activities are summarized in Figure 6 and described below.

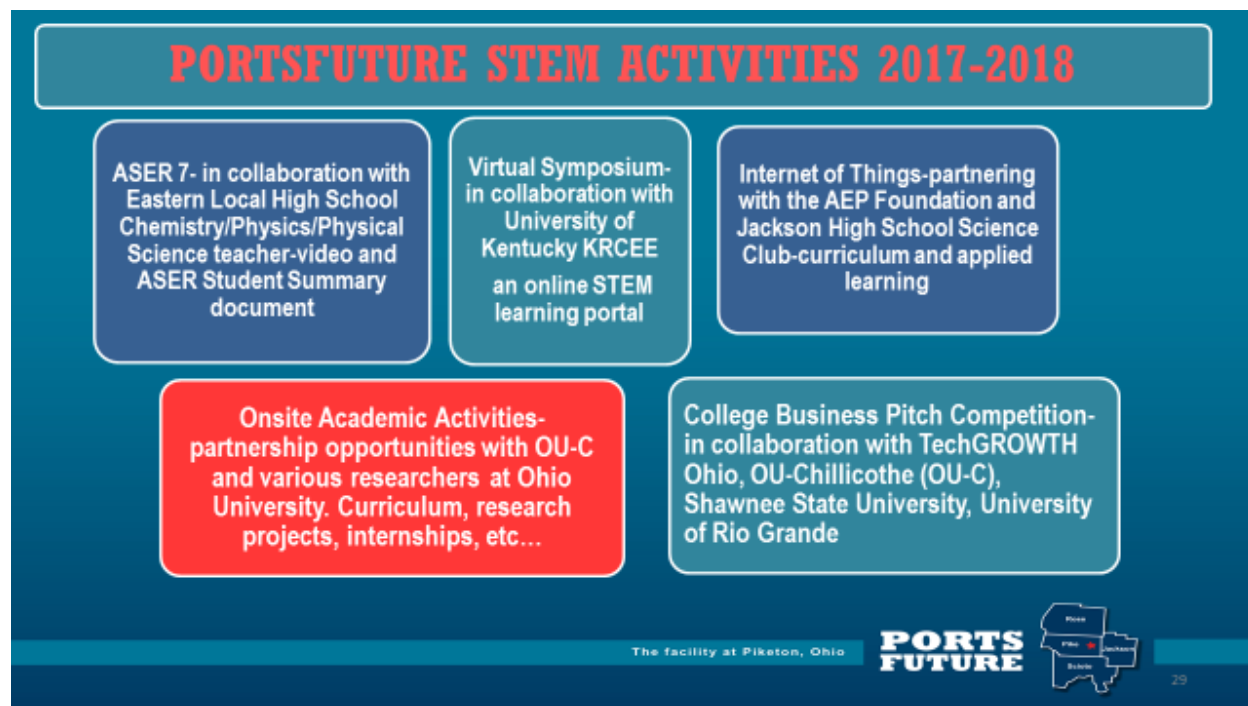


Figure 6-PORTSfuture STEM Activities 2017-2018

### **ASER 7**

ASER 7 (primarily funded under a separate task)-Ohio University is working with the chemistry/physics/physical sciences teacher and 9 students at Eastern Local High School in Pike County who are producing the 7th Annual Site Environmental Report Student Summary, that will

provide information to the public about the US Department of Energy's progress on cleanup work at PORTS. Students receive: SME seminars on site history, site cleanup and other environmental engineering topics; participate in a site tour; and participate in an applied field learning experience during the timeframe of August 2017-April 2018 to inform their writing of the ASER summary document. The final report and video will be completed by August 31, 2018.

### **Community Entrepreneurship Panels**

At the request of site stakeholders, Ohio University collaborated with regional economic development entities and/or other community leaders to complete a series of community entrepreneurship panel discussions in Pike, Jackson, Ross and Scioto counties. Local business owners provided information and engaged in discussions with community members to assist small business owners and aspiring entrepreneurs desiring to start a small business. Some of these start-ups may align with future use opportunities or be related to the ongoing D&D of the DOE reservation.

See sample event flyer in Appendix 2. Two events occurred during the previous grant period and the two events were held in April of grant year 2. Event dates include:

- Scioto County event-collaboration with Shawnee State- March 13, 2017 at Shawnee State University.
- Ross County event- collaboration with Ohio University Chillicothe Campus- March 16, 2017 at Ohio University Chillicothe Campus.
- Jackson County event-collaboration with Mayor of Jackson, Ohio and the Jackson County Economic Development Office-April 5, 2017 at the County Extension facility.
- Pike County event-collaboration with the Appalachian Regional Commission Local Development District known as the Ohio Valley Regional Development Commission (OVRDC)-April 12, 2017 at the Endeavor Center in Pike County.

### **College Student Business Pitch Competition**

At the request of site stakeholders, Ohio University is collaborating with regional higher education institutions to conduct an inter-institutional pitch competition for college students in counties surrounding the site. Collaborators include Ohio University-Chillicothe located in Ross County and Shawnee State University located in Scioto County. Students will participate in an academic exercise to innovate business ideas using some (or all) of the resources available at the reservation including land, buildings, personnel and expertise to plan for business opportunities that align with SODI's Integrated Energy System Complex reindustrialization goals. Students will be engaged by OU staff and faculty in person and via seminar discussions and periodic pitch reviews. Students will gain applied learning related to locally-based economic development opportunities and experience multi-disciplinary, team project approaches to regional economic and enterprise development. Relevant life-skill training included the 'Lean Launch' approach to entrepreneurship; regional economic development; general principles of new start-ups including the problem-solution equation, basic market research, high-level financial and strategic planning; and pitching a project before judges. Students will engage in an intra-institution round of pitch competitions, and a final round of competition between institutional finalists. Dates and locations of pitch competitions to be determined and will occur spring semester of 2018.

### **Internet of Things STEM Outreach Project**

The Internet of Things (IoT) is affecting almost every aspect of our lives — this rapid integration of the physical and digital world is starting to fundamentally change 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. Ohio University is piloting an IoT project with the Jackson High School after-school “Power Rangers” science club. This project will teach students how to power a variety of functions via sensors in a model “smart home”. Students will construct the home and sensors and analyze collected data from the sensors.

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 will: 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. The project will be carried out during spring semester of 2018.

### Virtual Symposium

The Virtual Symposium 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 and also provide valuable information to the public at large about applied research 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. Thirteen environmental career videos and one Integrated Energy System (IES) complex overview video were added in this grant year. The Virtual Symposium can be viewed at: <http://www.portsfuture.com/VSP/Default.aspx>

### Exploring Opportunities for Onsite Academic Initiatives

DOE PORTS made an inquiry regarding exploring opportunities for utilizing the PORTS site for academic research and teaching initiatives for Ohio University faculty and students in the region. DOE PORTS can provide access to the site, data, and Subject Matter Experts (SMEs).

Interest expressed from OU faculty and researchers includes:

- 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. OU-C and OU-Southern are currently looking at redesigning this curriculum so timing is good to see how to work with DOE.
  - Utilizing SMEs to teach in the program.
    - DOE has taught in this program in the past and OU-C and OU-Southern interested in expanding use of SMEs from the site in their program.
  - Utilizing site, data, SMEs for research projects, student research, and visiting faculty fellowships.
  - Site tours/field trips for faculty and students.
  - 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.
  - Utilize access to the site, SME’s, data as in-kind match to grants.

- Will explore Ohio University's membership in Oak Ridge Associated Universities (ORAU) that provides access to other university members with whom to partner on grants from ORAU and other sources that can only be pursued if the institution is a member of ORAU.
  - Interested in STEM activities for middle school and high school students in the area such as Science Alliance participation, DOE Science Bowl, and other STEM outreach
- Ohio University-Athens Campus
- Voinovich School faculty hydrologist expressed interest in utilizing the site for class field trips for the 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 would then be used to model different infiltration scenarios and plume migration in a changing climate; examining storm water infrastructure resiliency in a changing climate; establishing and monitoring geomorphological, flow, and sediment transport characteristics of streams on site and model future conditions.
- Voinovich School faculty ecologist focused on bioenergy and biomass products interested in utilizing the site for class fieldtrips to demonstrate remediation and legacy infrastructure and is also interested in the phytoremediation projects for research/ student research.
  - Associate Dean for Industry Partnerships OU Russ College of Engineering and Technology will discuss with the Dean and the RCE&T Center and Institute Directors to 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.

### **Dissemination of Program Activities**

In addition to the [www.portsfuture.com](http://www.portsfuture.com) website, the OU/UK Virtual Symposium, presentations to the Site Specific Advisory Board, and frequent contact with regional site stakeholders, Ohio University applied and was accepted to provide a technical presentation at the Annual American Society of Mechanical Engineers (ASME) Energy Sustainability Conference in June of 2018. OU will present on the Integrated Energy System Complex concept that is the focus of the PORTS site reindustrialization efforts.

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

At the request of SODI, this activity is currently tabled until SODI's site reindustrialization initiatives are more fully formed.

### **SODI Operational and Project Funding**

At the request of SODI, Ohio University is assisting SODI with securing additional funding to support site reindustrialization efforts.

### **State Capital Budget funds \$250K**

See reference above in 'master planning activities'.

### Other grant dollars

Ohio University continuously provides SODI with information on possible federal and state funding opportunities and advises on public/private partnerships aligned with SODI's work. Ohio University consistently offers to support SODI in pursuing such funds and partnerships if SODI chooses to do so.

### Data and GIS

As stated earlier, the purpose of the two tasks 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, so that cost savings/cost avoidance may be realized by DOE as 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 7 and described below.

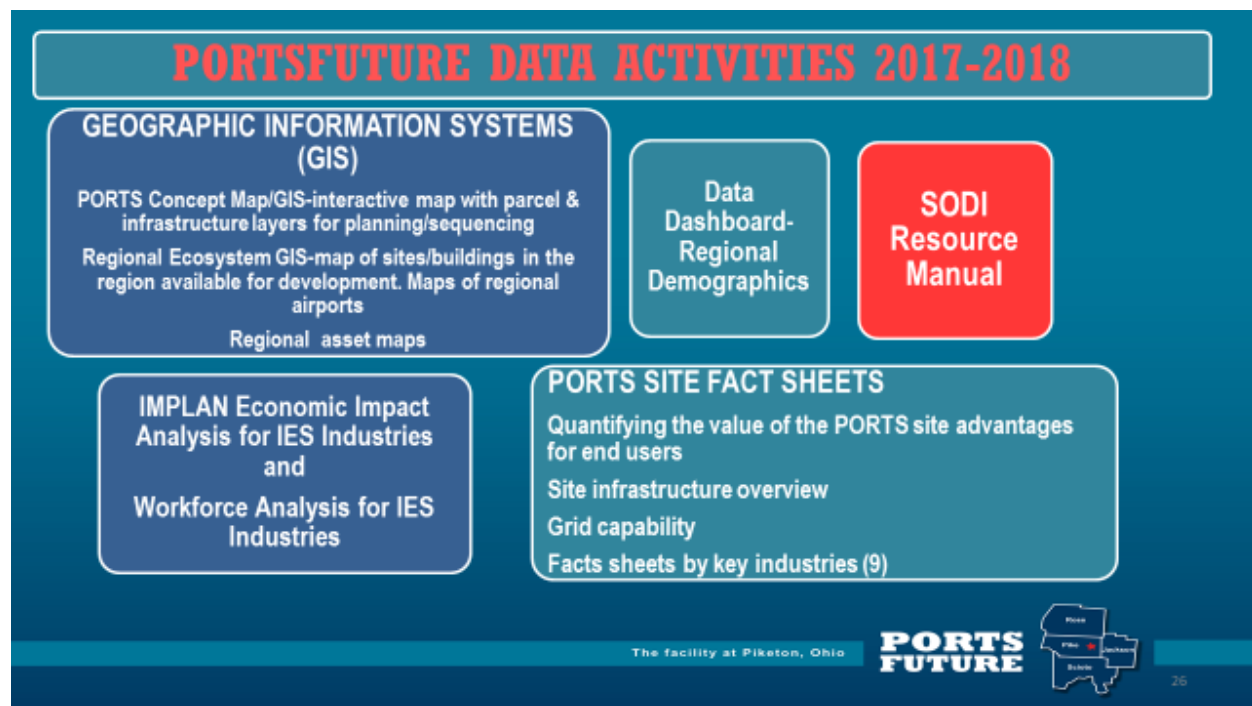


Figure 7-PORTSfuture Data Activities 2017-2018

- SODI Resource Manual-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 Integrated Energy System (IES) Concept diagram that depicts input/output processes and related industries shown in Figure 3 above and the IES technical concept diagrams that depict the mechanical and chemical engineering components of an IES complex shown in Appendix 1 below. OU will 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, facts sheets are being 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.

Deliverables:

- Site infrastructure overview
  - Grid capability
  - Facts sheets by key industries
    - Data centers
    - Combine Cycle Gas Turbine (CCGT) facility
    - Refineries (gas, coal, biomass, oil)
    - 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...)
- 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/>
- Maintaining previously developed regional asset maps. These asset maps visually display relevant regional assets useful for future site use decision-making such as highways, hazmat routes, rail, airports, navigable waterways, accredited education institutions, and metro centers and population that can be reached within various drive times from the site. These maps can be viewed at: <http://app.voinovichschool.ohio.edu/datateam/portsmap/> and
- <http://ohiou.maps.arcgis.com/apps/webappviewer/index.html?id=e5e8bf0c28464fa9b558cd6064afce98>
- Developing a PORTS concept map which is an interactive site map with various layers including site infrastructure, topography, limitations, parcel transfers, and other information to be used in site planning efforts. This is a GIS database for 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=fe14a57f8ccb48d4875cbfbeb17e0271>

Deliverables:

- Interactive GIS database site map
- Useable now and will continue to be augmented as needed/as appropriate.

- Maintaining Regional Ecosystem Map depicting industry parks, developable land and airports in the four county area currently under development and can be viewed at:  
<http://ohiou.maps.arcgis.com/apps/webappviewer/index.html?id=9e371f5385334e908023dde3a1a16ba7>

Deliverables;

- Interactive GIS database regional ecosystem map
- Useable now and will continue to be augmented as needed/as appropriate

- Southern Ohio Incubator Feasibility Study-Partnering with Ohio University's Office of Regional Campuses and OU's Leveraging Innovation Gateways and Hubs Towards Sustainability (LIGHTS) program and its partners, Lawrence Economic Development Corporation, Ohio Valley Regional Development Corporation, and others to undertake a feasibility study to determine if a business incubator in Lawrence County, Ohio that will serve the region is feasible. The scope of work for this grant will advance an existing partnership framework to connect a series of Innovation Gateways in Appalachian Ohio and the tristate region including Kentucky and West Virginia. LIGHTS is an economic development initiative spearheaded by Ohio University and funded by the Appalachian Regional Commission. The Gateways are independent nodes that focus on entrepreneurship, education, and community makerspaces.

Deliverable:

- Feasibility study report

- Innovation Strategy-Collaborating with a multi-disciplinary team and leveraging an OU Innovation Grant to explore "Emerging Coproduction Systems" focused on biomass/bio products industries that could be sited at PORTS as part of the Integrated Energy System complex. Team includes OU faculty in the disciplines of ecology, chemistry/biochemistry, sustainable energy, electrochemical engineering, hydrology, economic modeling, public policy, and the OU Director of Industry Partnerships. The overall goal of this project is to determine the feasibility of a fully-scaled coproduction system that uses local renewable resources to generate energy, fertilizer, and chemical building blocks for industries that currently rely on non-renewable sources. Preliminary data will be generated from (1) an assessment of the economic impact potential of coproduction systems, (2) quantification of abandoned land area in the region, and (3) preliminary analysis of two pathways to value-added products. PORTSfuture is funding data analysis of the economic impact of potential coproduction systems and potential job creation.

Deliverable:

- Economic impact analysis of potential of coproduction systems of biomass/bioproducts

- Maintain industry contact database currently under development. This database will identify initial anchor, complimentary, and support industries for developing an Integrated Energy System complex at PORTS. Relationships would need to be established with the entities to drive the development of the IES complex.

Deliverables:

- Contact database organized by industry category
- Useable now and will continue to be augmented as needed/as appropriate.

- As requested, Ohio University will produce other data needed to support efforts to accurately portray the site and site assets for property transfer and site reuse with deliverables

to be determined.

OU PORTSfuture previous tasks, data, and reports that 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 available at: <http://www.portsfuture.com/HabitatandLandUse.aspx>
- 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: <http://www.portsfuture.com/HabitatandLandUse.aspx>

### **Ohio University Support**

Entities listed above in the 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 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; and share information to support SODI's site reuse mission. These activities are summarized in Figure 8-PORTSfuture Outreach Activities 2017-2018.



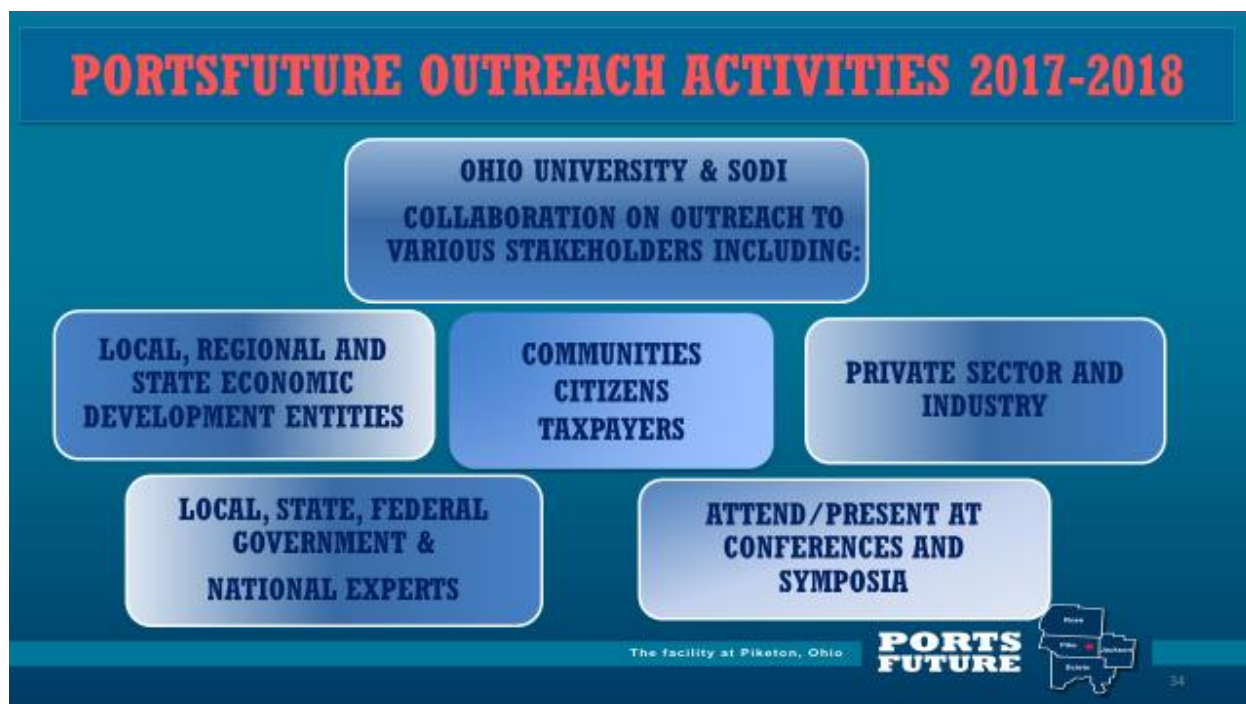


Figure 8-PORTSfuture Outreach Activities 2017-2018

- **Center for Electrochemical Engineering Research (CEER) and OU's National Science Foundation (NSF) Center for Electrochemical Processes and Technology (CEPro TECH)**- The Centers collaborate with industry and government partners and focus on providing out of the box solutions to the problems encountered by chemical and electrochemical industries. Dedicated to research and education in electrochemistry and to local, regional, national, and international economic growth.  
Source: <https://www.ohio.edu/engineering/ceer/mission.cfm>
- **Coal Research Center**- 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>
- **Institute for Corrosion and Multi-Phase Technology**- research 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 complex.
- **Shale boom and bust innovation grant**-A team of OU engineers and policy experts was recently 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 three-year project supports existing/new research at OU and the opportunity to leverage the activities with new partners.

- **Biomass and bio-digesters**- researcher based at the Voinovich School who is exploring opportunities for bioenergy development that will simultaneously enhance ecosystem services.
- **Related OU academic departments**- economics, engineering, chemistry, public administration/public policy, etc...
- **Ohio Education Resource Center (OERC)** –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.
- **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 Industry Partnerships participated in a tour of the site, met with SODI and DOE to learn more about the site reindustrialization effort, and committed to providing support to the effort when possible.
- **OU Entrepreneurial Ecosystem** (Small Business Development Center, Procurement Technical Assistance Center, 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.
- **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.
- **Rural Revitalization Initiative**-as Ohio University develops and pursues a comprehensive rural strategy, the PORTS site reindustrialization initiative will be included as an important priority for regional economic development in southern Ohio.

### **National experts and thought leaders**

Ohio University 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 Esquire-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 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
- Stephen Golding-Formerly Vice President for Finance and Administration for Ohio University, formerly Senior Vice President for Strategic Initiatives at Ohio University and now an Executive in Residence at Ohio University.
- Dr. Joe Shields-Vice President for Research and Creative Activity and Dean of the Graduate College at Ohio University.
- Dr. Kevin King-Director of Industry Partnerships at Ohio University.
- Dr. Greg Browning-President of Capital Partners. Former Ohio University Board of Trustee. Former Director of the 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 complex initiative forward. Some of the entities/organizations that have been engaged and with whom ongoing contact exists include:

### **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>

The OU Office of Research invited the Voinovich School and the Russ College of Engineering and Technology to meet 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 complex and Shale Crescent USA will continue to be a resource for the IES complex effort as it develops.

### **ACE Educational Foundation, Inc.**

ACE Educational Foundation Inc. is affiliated with Ohio Valley University, a private college in Parkersburg, West Virginia. ACE describes their focus as follows: “The OVU Alternative Clean Energy (ACE) facility, which will be owned by the OVU-ACE 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 leaders have had several meetings with Ohio University faculty and staff, as well as with the Appalachian Partnership for Economic Growth (APEG) which is the southern Ohio arm of the state JobsOhio economic development program. OU has introduced ACE to SODI and upon learning about the infrastructure assets and site reindustrialization focus of and IES, ACE is interested in exploring opportunities to site a facility at the PORTS site. Discussions are ongoing as of winter 2018.

### **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.

OU, SODI and DOE hosted a site tour and met with this business to discuss synergistic opportunities between an IES complex and their sustainable food production efforts. Endless Sky utilizes grow houses that could be powered by process heat generated by an IES complex. 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 to as the IES complex effort develops. Discussions are ongoing as of winter 2018.

### **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, will 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 and contact with NextGen will continue with them as the IES complex effort develops. Conference calls and email discussions are ongoing as of winter 2018.

### **Hecate Energy**

OU, SODI and DOE hosted a site tour and met with this business to discuss synergistic opportunities between an IES complex and their sustainable energy production efforts. Hecate Energy is currently pursuing a large solar farming and solar panel manufacturing initiative that would be cited in the Pike/Scioto/Lawrence Counties region. Synergies exist with their efforts and contact with Hecate Energy will continue as the IES complex effort develops. Conference calls and email discussions are ongoing as of winter 2018.

### **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 complex's closed-loop manufacturing concept in 2017. Members were very supportive of the IES 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 will continue as the IES complex effort develops.

### **Summary and next steps**

Ohio University is honored to remain a part of, and to continue to add value to, the 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 (IES) 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 grant activities through collaborations leveraged ~\$367,000 in additional funds in grant year 2 to advance various aspects of the work described in this report. See leveraged funds through collaborations are depicted in Figure 9 below.

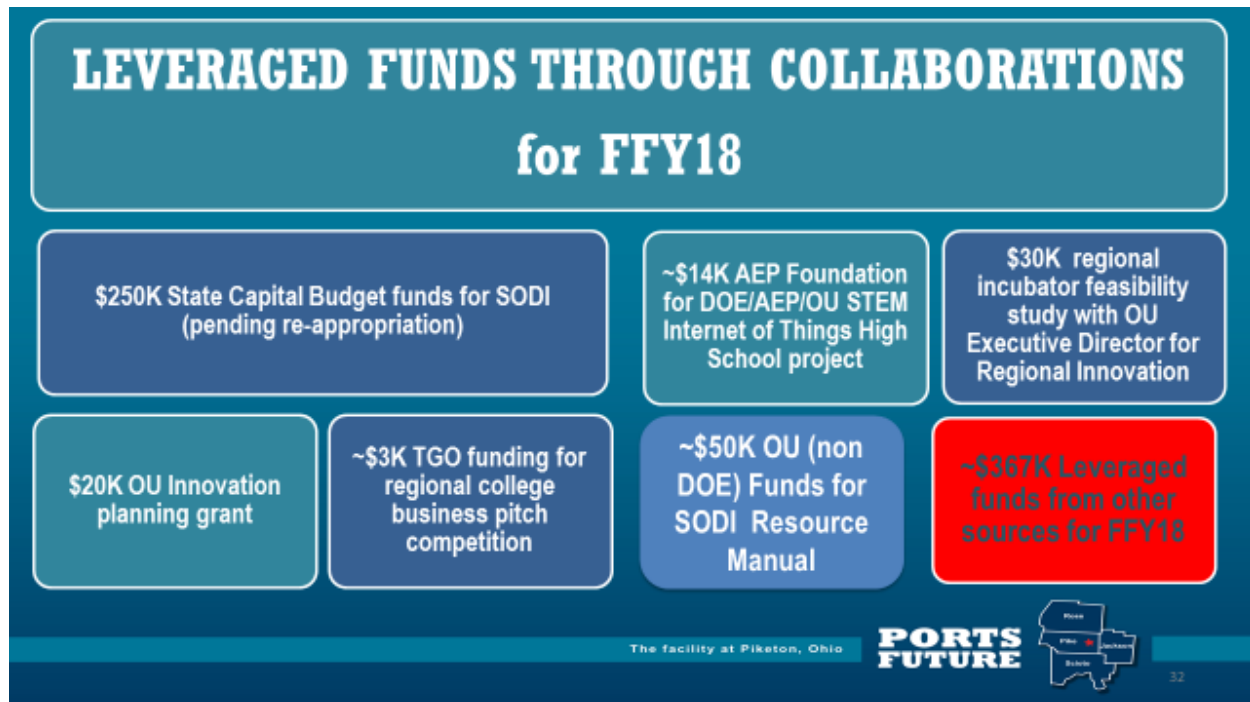


Figure 9-Leveraged funds through collaborations

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. Proposed future activities include:

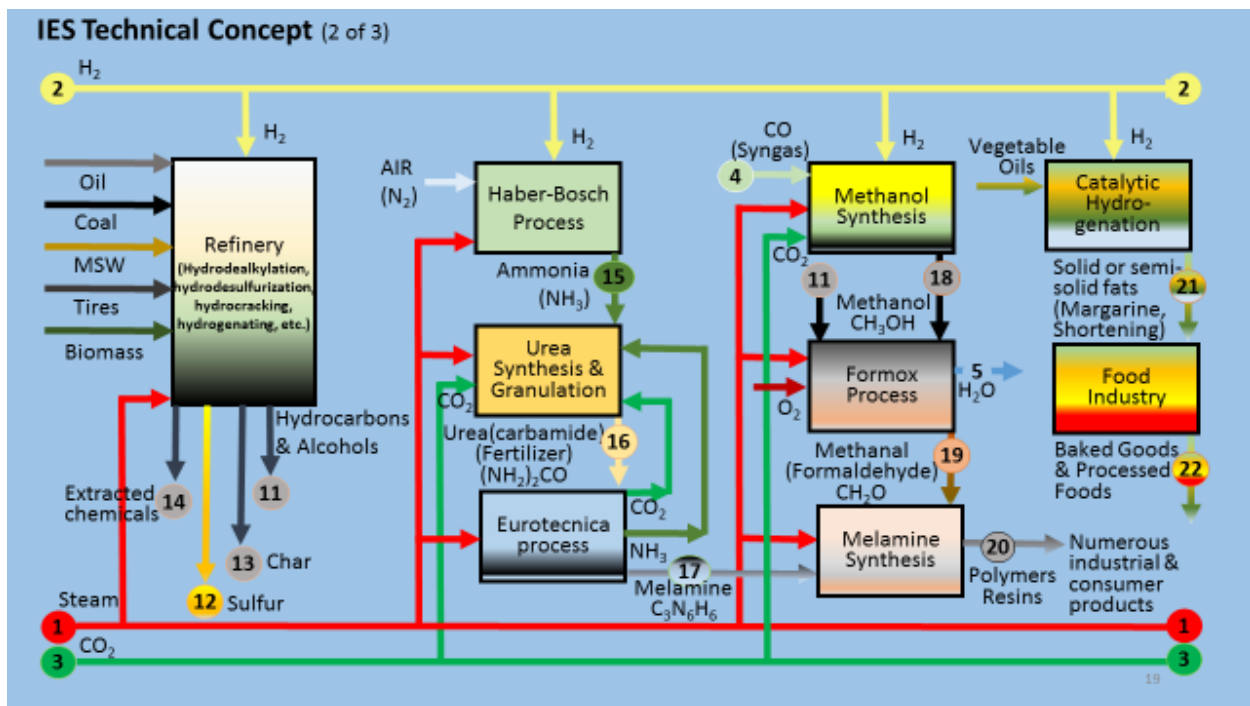
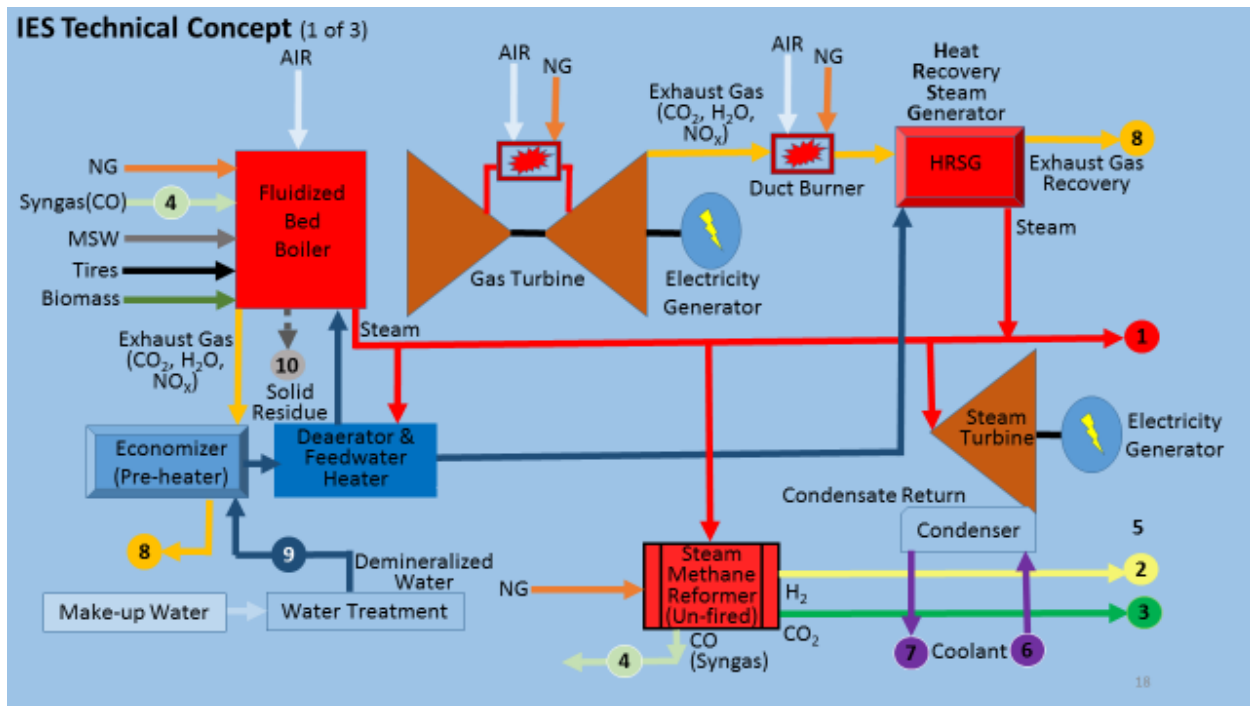
- Continuing to carry out work depicted in the OU Current Grant Activities graphic shown earlier in this report in Figure 1.
- Continue to identify IES complex industries and related industry needs to support expansion in the region and/or at the PORTS site. Conduct targeted industry site infrastructure 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.
- Create reuse attributes index when requested by SODI to identify/summarize recreational, green space and conservation attributes. Create index/matrix of infrastructure requirements for targeted industries



(e.g. water, gas, electric, security, other). 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.

- Conduct analysis of transportation networks of presumed industrial users' demands on road, rail and barge. This assessment will inform an aspect of NEPA analysis regarding how transportation and how the proposed action – site reuse – would impact transportation networks. At the request of SODI, this activity is currently tabled until SODI's site reindustrialization initiatives are more fully formed.
- 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.
- Produce data needed to support these efforts (e.g. this may include maintaining existing data dashboards, creating profiles of regional economies-and/or other data to be determined).
- 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.
- 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 bio-energy 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 to be defined in collaboration with program partners.

## Appendix 1 Integrated Energy System (IES) Technical Concept



# PORTSFUTURE

IMAGINING THE OPPORTUNITIES, GATHERING YOUR IDEAS  
THE FACILITY AT PIKETON, OHIO



## ENTREPRENEURSHIP ROUNDTABLE

To learn about resources available to start or grow your business  
and to network with business assistance providers

**Monday, March 13, 2017  
6:00 p.m. – 8:00 p.m.**

*Refreshments provided*

**Shawnee State University  
Morris University Center  
Sodexo Ballroom  
940 Second Street  
Portsmouth Ohio 45662**

**CLICK HERE TO REGISTER  
by March 6, 2017**

### PANELISTS

**Greg Merrill, CEO of Yost Labs**, one of the fastest growing tech companies in Ohio. Greg is an entrepreneurial leader with 25 years of experience developing award winning medical and consumer electronic products. He has served as founding CEO for three VC-backed fast growth technology-based companies.

**Dale King and Renee Wallace of Doc Spartan**, a veteran-owned company based in Portsmouth. They produce all natural products for skin and beards, and every order is handmade, labeled and shipped out by their small team. Dale and Renee will appear on ABC's Shark Tank on Friday, February 10, at 9 p.m.

**Alex Russell, a senior computer engineering technology major at Shawnee State University**, helped to start LITS, an IT services company, and he now works there full-time while finishing his degree at Shawnee State University in computer engineering technology.

Questions? Angela Duduit, 740.351.3322,  
aduduit@shawnee.edu

**THIS EVENT IS FREE AND  
OPEN TO THE PUBLIC**



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