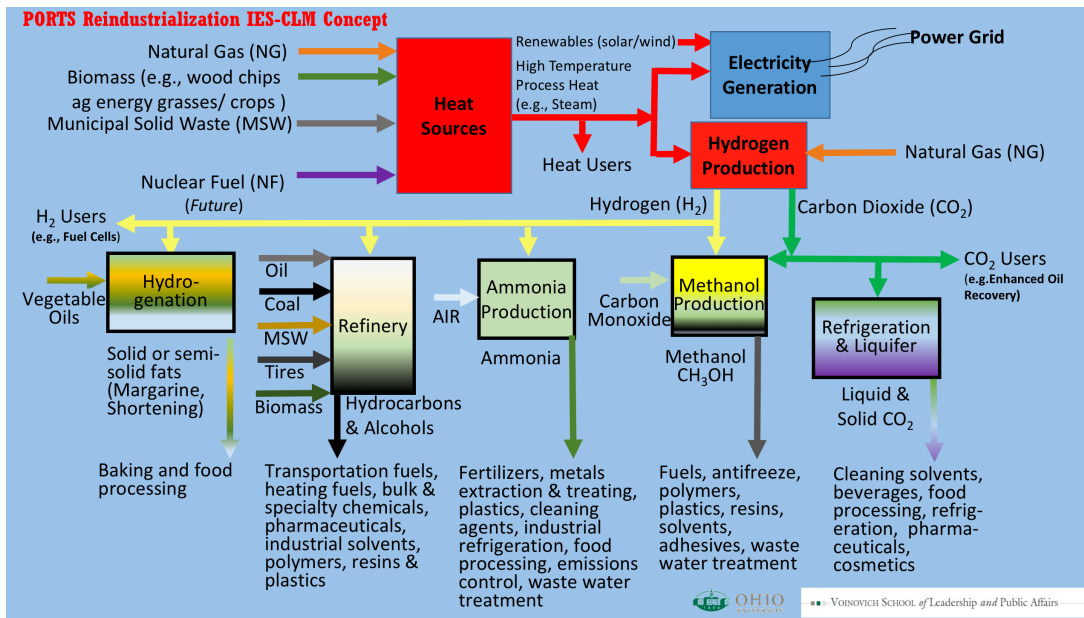




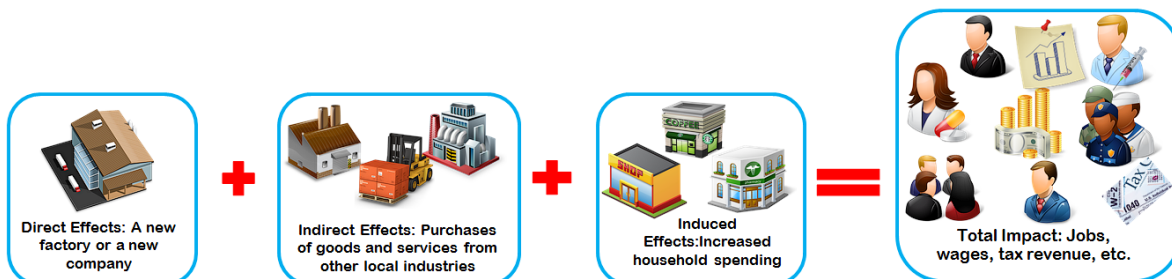
ECONOMIC AND WORKFORCE IMPACT ANALYSIS FOR PROPOSED TIER 2 INTEGRATED ENERGY SYSTEM (IES) INDUSTRIES AT PORTS

Ohio University's Voinovich School of Leadership and Public Affairs PORTSfuture project is supporting the Southern Ohio Diversification Initiative's (SODI) efforts to pursue the development of an Integrated Energy System (IES) complex at the US Department of Energy PORTS reservation in Ohio. An IES closed-loop, advanced manufacturing complex will strive to fully leverage the unique infrastructure and other assets of the site for regional economic growth by attracting and expanding industries in the region, leveraging coal and shale resources in additive manufacturing applications, creating jobs, and growing the southern Ohio economy.

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, 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, non-exportable higher-quality jobs can be achieved. An IES embodies a synergistic integration of an "all-of-the-above" energy strategy.



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 and will identify how to best prepare the PORTS 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 healing by growing both large and small business opportunities in southern Ohio and beyond.



The PORTSfuture project is funded by a grant from the US Department of Energy Office of Environmental Management Portsmouth/Paducah Project Office.

LIQUID AND SOLID CO₂: 500 TONS/DAY CAPACITY

PROJECT SIMULACRUM: Continental Carbonic, Clearfield, PA

PROJECT STUDY AREA: OVRDC region (i.e., Adams, Brown, Clermont, Gallia, Highland, Jackson, Lawrence, Pike, Ross, Scioto, and Vinton Counties, Ohio)

IMPLAN OVERVIEW: IMPLAN is an acronym for IMpact analysis for PLANing and is a widely used tool for economic impact analyses. IMPLAN uses a general input-output model that uses secondary data from the BEA, BLS, and Census.

KEY DEFINITIONS: The Multiplier is the ratio of the Total Effect to the Direct Effect. Employment is annual average jobs of full and part-time employees and self-employed people. Labor Income is composed of both the wages and benefits paid to employees, and the profits earned by self-employed people. Value Added (or Gross Regional Product) is the combination of Labor Income plus corporate profits, interest income, rental payments, sales tax, excise tax, property tax, fees, fines, and licenses. Finally, Output is the combination of Value Added plus the materials and services (other than employment) required by an industry to create its products.

LIQUID AND SOLID CO₂ ECONOMIC IMPACT

CONSTRUCTION				
Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	400	\$18,197,021	\$22,366,995	\$44,231,556
Indirect Effect	38	\$2,076,606	\$3,298,538	\$6,426,038
Induced Effect	92	\$3,171,520	\$6,357,641	\$11,138,906
Total Effect	530	\$23,445,147	\$32,023,173	\$61,796,500
Multiplier	1.324	1.288	1.432	1.397

OPERATION				
Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	80	\$6,890,822	\$23,080,797	\$68,643,304
Indirect Effect	94	\$4,703,661	\$11,032,045	\$23,360,632
Induced Effect	53	\$1,814,209	\$3,633,127	\$6,367,597
Total Effect	227	\$13,408,693	\$37,745,969	\$98,371,532
Multiplier	2.838	1.946	1.635	1.433

LIQUID AND SOLID CO₂ WORKFORCE IMPACT

CONSTRUCTION			
Occupation	Total Ohio Workforce	Percentage of Project	CO2 Construction Jobs
Construction And Extraction Occupations	180,550	57.7	231
Management Occupations	239,640	13.0	52
Office And Administrative Support Occupations	815,240	9.9	40
Business And Financial Operations Occupations	261,220	6.2	25
Architecture And Engineering Occupations	94,370	4.0	16
Installation, Maintenance, And Repair Occupations	210,310	2.6	10
Production Occupations	494,570	2.0	8
Transportation And Material Moving Occupations	397,650	2.0	8
Sales And Related Occupations	509,470	1.0	4

OPERATION			
Occupation	Total Ohio Workforce	Percentage of Project	CO2 Operation Jobs
Production Occupations	494,570	41.8	33
Installation, Maintenance, And Repair Occupations	210,310	9.9	8
Architecture And Engineering Occupations	94,370	8.3	7
Life, Physical, And Social Science Occupations	35,490	7.9	6
Transportation And Material Moving Occupations	397,650	7.7	6
Office And Administrative Support Occupations	815,240	7.5	6
Management Occupations	239,640	6.9	6
Business And Financial Operations Occupations	261,220	4.7	4
Sales And Related Occupations	509,470	2.0	2

FOOTNOTE:

1. Economic impact analysis done with IMPLAN software, version 3.1. IMPLAN is an acronym for IMpact analysis for PLANing and is a widely used tool for economic impact analyses. IMPLAN uses a general input-output model that uses secondary data from the BEA, BLS, and U.S. Census Bureau.

2. Underlying industry, occupation, and employment data are derived using national expected averages from the Bureau of Labor Statistics' May 2016 Occupational Employment Statistics (OES) survey and 2014-24 Industry-occupation matrix data, by industry tables. Occupations that constitute less than 0.1 percent of the industry, have fewer than 50 jobs, are confidential, or include poor quality data are not displayed. Post analysis occupations that constitutes less than 1 percent of any particular project and account for less than 1 job are omitted. Jobs numbers are then rounded. These compounding suppression effects cause the percentages to add to less than 100 and the sum of occupations to be less than the total number of jobs.

METHANOL: 1,000,000 TONS/YEAR CAPACITY

PROJECT SIMULACRUM: Methanex, Geismar, LA

PROJECT STUDY AREA: OVRDC region (Adams, Brown, Clermont, Gallia, Highland, Jackson, Lawrence, Pike, Ross, Scioto, and Vinton Counties, Ohio)

IMPLAN OVERVIEW: IMPLAN is an acronym for IMpact analysis for PLANing and is a widely used tool for economic impact analyses. IMPLAN uses a general input-output model that uses secondary data from the BEA, BLS, and Census.

KEY DEFINITIONS: The Multiplier is the ratio of the Total Effect to the Direct Effect. Employment is annual average jobs of full and part-time employees and self-employed people. Labor Income is composed of both the wages and benefits paid to employees, and the profits earned by self-employed people. Value Added (or Gross Regional Product) is the combination of Labor Income plus corporate profits, interest income, rental payments, sales tax, excise tax, property tax, fees, fines, and licenses. Finally, Output is the combination of Value Added plus the materials and services (other than employment) required by an industry to create its products.

METHANOL ECONOMIC IMPACT

CONSTRUCTION				
Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	1,250	\$56,865,685	\$69,896,853	\$138,233,600
Indirect Effect	117	\$6,489,392	\$10,307,929	\$20,081,368
Induced Effect	288	\$9,911,000	\$19,867,625	\$34,809,077
Total Effect	1,655	\$73,266,077	\$100,072,407	\$193,114,045
Multiplier	1.324	1.288	1.432	1.397

OPERATION				
Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	130	\$10,620,772	\$20,022,287	\$198,534,448
Indirect Effect	247	\$11,094,795	\$18,619,683	\$36,316,999
Induced Effect	99	\$3,397,811	\$6,804,991	\$11,926,433
Total Effect	476	\$25,113,377	\$45,446,961	\$246,777,879
Multiplier	3.658	2.365	2.270	1.243

METHANOL WORKFORCE IMPACT

CONSTRUCTION			
Occupation	Total Ohio Workforce	Percentage of Project	Methanol Construction Jobs
Construction And Extraction Occupations	180,550	57.7	721
Management Occupations	239,640	13.0	163
Office And Administrative Support Occupations	815,240	9.9	124
Business And Financial Operations Occupations	261,220	6.2	78
Architecture And Engineering Occupations	94,370	4.0	50
Installation, Maintenance, And Repair Occupations	210,310	2.6	33
Production Occupations	494,570	2.0	25
Transportation And Material Moving Occupations	397,650	2.0	25
Sales And Related Occupations	509,470	1.0	13

OPERATION			
Occupation	Total Ohio Workforce	Percentage of Project	Methanol Operation Jobs
Production Occupations	494,570	41.8	54
Installation, Maintenance, And Repair Occupations	210,310	9.9	13
Architecture And Engineering Occupations	94,370	8.3	11
Life, Physical, And Social Science Occupations	35,490	7.9	10
Transportation And Material Moving Occupations	397,650	7.7	10
Office And Administrative Support Occupations	815,240	7.5	10
Management Occupations	239,640	6.9	9
Business And Financial Operations Occupations	261,220	4.7	6
Sales And Related Occupations	509,470	2.0	3

FOOTNOTE:

1. Economic impact analysis done with IMPLAN software, version 3.1. IMPLAN is an acronym for IMpact analysis for PLANing and is a widely used tool for economic impact analyses. IMPLAN uses a general input-output model that uses secondary data from the BEA, BLS, and U.S. Census Bureau.
 2. Underlying industry, occupation, and employment data are derived using national expected averages from the Bureau of Labor Statistics' May 2016 Occupational Employment Statistics (OES) survey and 2014-24 Industry-occupation matrix data, by industry tables. Occupations that constitute less than 0.1 percent of the industry, have fewer than 50 jobs, are confidential, or include poor quality data are not displayed. Post analysis occupations that constitutes less than 1 percent of any particular project and account for less than 1 job are omitted. Jobs numbers are then rounded. These compounding suppression effects cause the percentages to add to less than 100 and the sum of occupations to be less than the total number of jobs.

POLYMERS: 1,100 KMT/YEAR CAPACITY

PROJECT SIMULACRUM: Solvay, Marietta, OH

PROJECT STUDY AREA: OVRDC region (Adams, Brown, Clermont, Gallia, Highland, Jackson, Lawrence, Pike, Ross, Scioto, and Vinton Counties, Ohio)

IMPLAN OVERVIEW: IMPLAN is an acronym for IMpact analysis for PLANing and is a widely used tool for economic impact analyses. IMPLAN uses a general input-output model that uses secondary data from the BEA, BLS, and Census.

KEY DEFINITIONS: The Multiplier is the ratio of the Total Effect to the Direct Effect. Employment is annual average jobs of full and part-time employees and self-employed people. Labor Income is composed of both the wages and benefits paid to employees, and the profits earned by self-employed people. Value Added (or Gross Regional Product) is the combination of Labor Income plus corporate profits, interest income, rental payments, sales tax, excise tax, property tax, fees, fines, and licenses. Finally, Output is the combination of Value Added plus the materials and services (other than employment) required by an industry to create its products.

POLYMERS ECONOMIC IMPACT

CONSTRUCTION				
Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	1000	\$45,492,551	\$55,917,486	\$110,578,888
Indirect Effect	94	\$5,191,514	\$8,246,344	\$16,065,095
Induced Effect	230	\$7,928,801	\$15,894,101	\$27,847,264
Total Effect	1.324	\$58,612,866	\$80,057,932	\$154,491,247
Multiplier	1.324	1.288	1.432	1.397

OPERATION				
Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	300	\$42,378,827	\$91,548,018	\$411,322,592
Indirect Effect	271	\$15,566,528	\$27,796,554	\$54,267,299
Induced Effect	263	\$9,067,389	\$18,153,222	\$31,819,270
Total Effect	834	\$67,012,744	\$137,497,794	\$497,409,162
Multiplier	2.780	1.581	1.502	1.209

POLYMERS WORKFORCE IMPACT

CONSTRUCTION			
Occupation	Total Ohio Workforce	Percentage of Project	Polymer Construction Jobs
Construction And Extraction Occupations	180,550	57.7	577
Management Occupations	239,640	13.0	130
Office And Administrative Support Occupations	815,240	9.9	99
Business And Financial Operations Occupations	261,220	6.2	62
Architecture And Engineering Occupations	94,370	4.0	40
Installation, Maintenance, And Repair Occupations	210,310	2.6	26
Production Occupations	494,570	2.0	20
Transportation And Material Moving Occupations	397,650	2.0	20
Sales And Related Occupations	509,470	1.0	10

OPERATION			
Occupation	Total Ohio Workforce	Percentage of Project	Polymer Operation Jobs
Production Occupations	494,570	48.3	145
Architecture And Engineering Occupations	94,370	9.4	28
Installation, Maintenance, And Repair Occupations	210,310	9.1	27
Office And Administrative Support Occupations	815,240	6.9	21
Management Occupations	239,640	6.2	19
Business And Financial Operations Occupations	261,220	5.2	16
Life, Physical, And Social Science Occupations	35,490	5.2	16
Transportation And Material Moving Occupations	397,650	3.4	10
Sales And Related Occupations	509,470	2.3	7
Computer And Mathematical Occupations	140,110	1.6	5
Construction And Extraction Occupations	180,550	1.0	3

FOOTNOTE:

- Economic impact analysis done with IMPLAN software, version 3.1. IMPLAN is an acronym for IMpact analysis for PLANing and is a widely used tool for economic impact analyses. IMPLAN uses a general input-output model that uses secondary data from the BEA, BLS, and U.S. Census Bureau.
- Underlying industry, occupation, and employment data are derived using national expected averages from the Bureau of Labor Statistics' May 2016 Occupational Employment Statistics (OES) survey and 2014-24 Industry-occupation matrix data, by industry tables. Occupations that constitute less than 0.1 percent of the industry, have fewer than 50 jobs, are confidential, or include poor quality data are not displayed. Post analysis occupations that constitutes less than 1 percent of any particular project and account for less than 1 job are omitted. Jobs numbers are then rounded. These compounding suppression effects cause the percentages to add to less than 100 and the sum of occupations to be less than the total number of jobs.