

# Task 5: Environment and Energy – Economic Analysis and Visualization of Future Industrial Applications at PORTS

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# Task 5: Economic Analysis and Visualization of Future Industrial Applications at PORTS

## TASK OVERVIEW

- Jackson, Pike, Ross, and Scioto Visioning Teams are developing future-use scenarios for PORTS.
- Task 5 involves two sub-tasks
  1. Construct visual representations of VT-developed future-use scenarios via digital imaging techniques that combine PORTS' GIS-based data with computer animations and simulations.
    1. OU's Game Immersion and Immersive Design (GRID) Lab will develop these visualizations
    2. GRID Lab and the [Immersive Video Intelligence Network \(IVIN\) project](#)
  2. Post-factual accuracy review the findings will be shared with the public,

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## Relevant Work Experience

- Some background walkthrough on methodology, data, analytic techniques, limitations, etc.
- One example of the most relevant project completed to date that employed IMPLAN

# Deliverables and Timelines

1. **Feb – Mar, 2011** Report on Project Task to date – encompasses data collection and finalization of study design
2. **Apr – Jun, 2011** Preliminary draft report and draft form of scenario visualizations completed
1. **Jul – Sep, 2011** Draft report revised as per needed modifications to analysis/interpretation, and scenario visualizations completed
1. **Oct – Dec, 2011** Report finalized and submitted to DOE and presented to key stakeholders

# Input/Output Models and Evaluation of Economic Impacts

- An economic impact analysis measures overall economic activity/contribution that results from some kind of change in one or several industries or changes in economic activities. Economic impact analysis offers an approach to quantify the impacts of these types of change on the local economy
- Input/Output modeling is a tool/framework used to quantitatively examine the relationships between government, policies, private businesses and consumers . It thus is an effective means of conducting economic impact analysis.
- I/O modeling is based on a multiplier effect, which refers to idea that a change in one industry/activity will lead to a change in overall economy.
- This allows I/O modeling to trace spending through an economy and measure the cumulative effects of that spending.

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## **IMPLAN: Description**

- **IMPLAN is a software, which utilizes a database to conduct I/O analysis. It generates multipliers that are used to calculate the impacts of industry output changes or government policies designed to affect economic development.**
- **IMPLAN utilizes a consistent social accounting matrix consisting of input and output information on more than 400 industries/sectors at the state and local level.**
- **These data (which come from a variety of public sources) can then be customized into a variety of forms depending upon the needs of clients in assessing economic impacts on production, employment, consumption, and economic growth**



## Data Sources

- U.S. Bureau of Labor Statistics
- U.S. Census Bureau
- U.S. Bureau of Economic Analysis
- U.S. Department of Agriculture

## Limitations

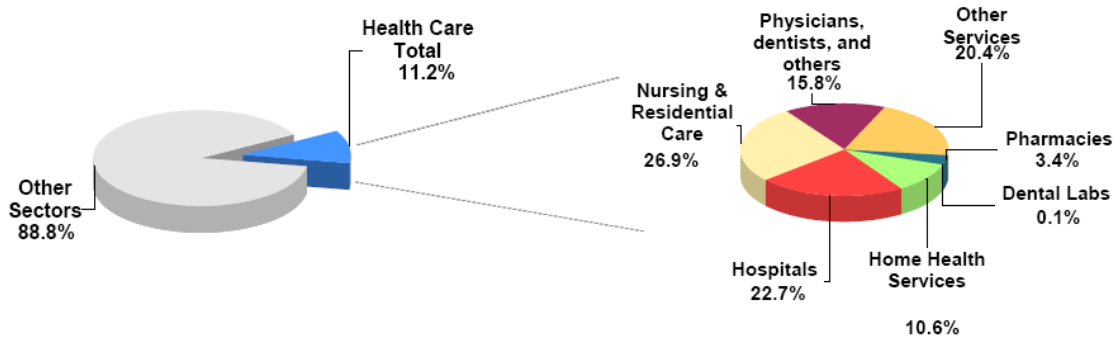
- Requires to make certain assumptions about scenarios
- **Constant Returns to Scale** – Production functions are considered linear with no recognition of economies of scale
- **No Supply Constraints** – Industries are assumed to have unlimited access to raw materials and output is limited only by demand
- **Fixed Commodity Input Structure** – Price changes are assumed to not impact a firm's buying decisions
- **Homogenous Sector Output** – The proportion of commodities produced by an industry is assumed to be the same, that is, all products of an industry will be produced at the same rate
- **Industry Technology Assumption** – It is assumed that an industry uses the same technology to produce all of its products.

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# Example: The Economic Impact of the Health Care

## Direct Health Care Employment in Athens County



## Total Economic Impact

	Employment			Income (\$Thousands)			Sales (\$Thousands)	
	Employed	Multiplier	Total Impact	Income	Multiplier	Total Impact	Retail Sales	County Sales Tax
Hospitals	690	1.49	1,030	31,506	1.27	40,033	13,451	168
Offices of physicians, dentists, and other health professionals	481	1.47	707	26,170	1.22	31,930	10,728	134
Nursing and residential care	819	1.25	1,025	20,936	1.23	25,673	8,626	108
Home health care services	322	1.15	370	4,899	1.24	6,066	2,038	25
Dental laboratories	2	1.32	3	118	1.17	139	47	1
Pharmacies and drug stores	102	1.25	128	2,441	1.27	3,105	1,043	13
Other ambulatory services	621	1.60	992	28,141	1.35	37,897	12,733	159
<b>Total Health Sector</b>	<b>3,037</b>	<b>1.40</b>	<b>4,255</b>	<b>114,212</b>	<b>1.27</b>	<b>144,842</b>	<b>48,667</b>	<b>608</b>
Total Athens County Economy	27,163		27,163	875,409		875,409		
Health Sector as a % of Athens County Economy	11.2%		15.7%	13.0%		16.5%		

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## Economic impact of the existing operations:

- The IMPLAN model, combined with information provided on employment and level of clean-up activities at the plant can then be used to quantify the overall impact of the existing operations . More specifically, it will allow us to examine employment, income and tax impacts on the immediate region as well as on the state as whole.



## Counter-factual scenarios:

- In addition, giving the proper data IMPLAN will allow us to observe the regional and state wide impacts of the number of counter-factual scenarios.
- For example, the impact of:
  - Clean-up activities
  - Energy production

### Data needed:

- Type of activities
- Employment estimates by type of activity and year
- Expenditure estimates by type of activity and year