Economic Development Value of the U.S. Navy Surface Combat Systems Center at Wallops Island

A Strategic Scenario Analysis

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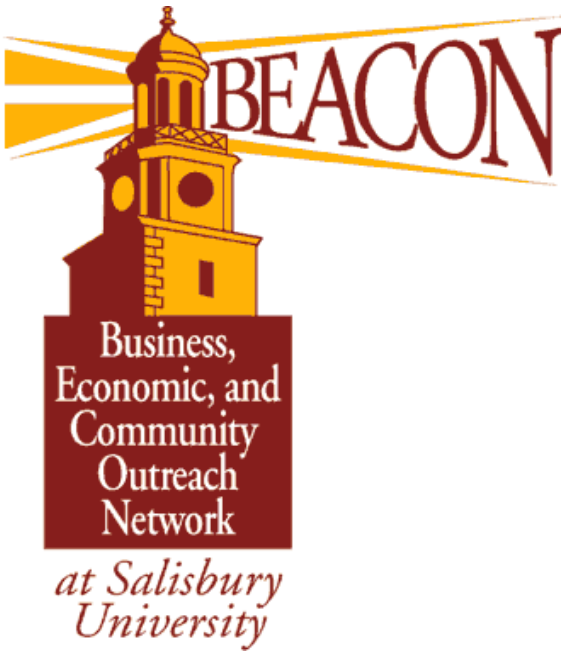

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PART I. INTRODUCTION

This study uses Input-Output (I-O) analysis to measure the economic development opportunity costs represented by the U.S. Navy Surface Combat Systems Center at Wallops Island, Virginia (SCSC), for the economic development community of the surrounding region. These opportunity costs are then used to develop a scenario analysis model. The findings from the various scenarios analyzed are then presented for use by public-policy decision-makers for developing strategic economic development actions to better leverage the presence of the SCSC in the region. The region is defined as Accomack and Northampton Counties on the Eastern Shore of Virginia, and Somerset, Wicomico, and Worcester Counties on the Lower Eastern Shore of Maryland.

Economic Input-Output Modeling

The I-O model was developed by Vassily Leontief in 1936 to explain how the outputs of various industries and the prices of their products react to changes in productivity and savings. The first formal application of the model occurred in the late 1940's to determine the effect of demobilization on the US economy at the end of World War Two. The validity of I-O analysis was confirmed in 1973 when Leontief won the Nobel Prize in Economics.

The Multipliers of the Input-Output Model

The I-O model is a favored tool among economic analysts because it can measure the following three items:

• Changes in final demand in the economy due to the presence of a particular firm or institution.

• Total multiplier effects made by an entity including employment, earnings, and output.

• Inter-industry linkages affected by a particular firm, institution or economic sector.

The main thing to understand about multipliers is that they forecast the extent by which the economy will increase or decrease because of a change in a particular sector that changes demand or changes the way financial resources circulate within that given economy. For example a multiplier of 2 for a given industry means that for a $1 investment in another industry you would expect to see a two-fold increase in the business activity of the industry in question. This increase affects other industries in a chain reaction that is best understood by using mathematical matrices. The multiplier is composed of 3 elements including:

1. **Direct effects**: revenues, jobs, and wages that a new business or expanding business brings into the local economy (or removes from the economy).

2. **Indirect effects**: purchases that business makes from other local firms, which in turn generate revenues, wages and jobs in those affected companies and industries.

3. **Induced effects**: relate to the specific behavior of the labor force. These effects occur when employees working at the affected businesses have more (or less) money to spend on items such as food, transportation, housing, entertainment and a wide variety of other services (Bureau of Economic Analysis 1992).

The total effect on the economy is determined by examining the combined impacts on all of the industries present in the area. An investment in one part of the economy will have a ripple effect that affects other areas of the economy in what amounts to a virtuous cycle (in the case of growth) where development in one industry feeds the development of another. I-O modeling is therefore a valuable tool for economic planners and developers in making forecasts that can be used to plan the long-run fiscal management of a community, plan for housing developments, attract businesses, and apply for bank loans.

The IMPLAN Economic Impact Model

Developed by the Minnesota Implan Group (MIG, Inc.) in Minneapolis, IMPLAN (Impact Analysis and Planning) is an I-O modeling system. Like all I-O models, IMPLAN is based on the theory that when new money enters a

community through investment, revenues, or income, some of it is re-spent one or more times in the local economy, thereby creating additional economic impact. This “multiplier effect” or impact is measured in terms of employment or income. The total economic effect on a region caused by a change in final demand is measured in terms of industrial output, employment, employee compensation, and value-added in dollars, giving rise to industrial output, employment, personal income, and value-added multipliers.

Output multipliers show the effect of changing the demand for one industry's products on the output of the entire economy. These multipliers represent the value of production required from all sectors, by that industry, to deliver a given dollar amount of output to final demand.

Employment multipliers show the effect of new employment or loss of employment in one industry on the level of employment in the entire economy. These multipliers do this by estimating the number of jobs created/lost from the production/loss of a given dollar amount of additional output for final demand.

Employee compensation multipliers show the effect of new income in one industry on the level of wages and salaries in the entire economy. These multipliers do this by estimating the effects on employee compensation generated by a given dollar amount of additional output for final demand.

Value-added multipliers show the change in total value-added that occurs throughout the economy per unit of value-added change in any industrial sector. They estimate the effects on total value-added for the economy as a whole generated from the production of a given dollar amount of additional output for final demand by a particular industry.

IMPLAN Economic Impact Analysis of the SCSC on the Region.

Impact Event: The purpose of the IMPLAN analysis is to measure the economic development opportunity costs represented by the U.S. Navy Surface Combat Systems Center at Wallops Island, Virginia (SCSC), for the economic development community of the surrounding region.

PART II. DATA

The analysis was conducted utilizing the IMPLAN economic impact analysis model. The model was constructed with data from a variety of sources.

- Members of the Eastern Shore Defense Alliance provided economic activity data regarding the operations of the SCSC (i.e. Employment, Payroll, Local Purchases, etc.). Direct SCSC spending totals by jurisdiction that form the basis of this economic activity are presented in Table 1.

- The IMPLAN Group provided Maryland and Virginia economic, demographic, and industry (by SIC/NAICs code) data.

- IMPLAN data is based on national industry averages (509 sectors) and annual Maryland and Virginia data (2001).

- Bureau of Labor Statistics data was used to convert to full-time equivalent (FTE) employment impact.

- Results are adjusted for a specific county or region via Regional Purchasing Coefficients.

TABLE 1. Direct SCSC Spending in the Study Area

Chincoteague	$5,433,204
Other Accomack County	$7,934,246
Pocomoke	$4,374,911
Other Worcester County	$1,068,493
Somerset	$729,495
Wicomico	$2,870,344
Other Local	$1,401,867

TABLE 2: SCSC Economic Development Opportunity Cost Estimates

	Direct	Indirect	Induced	Total
Value Added	$30,835,844.00	$350,749.00	$16,154,221.00	$47,340,814.00
Employee Compensation	$19,936,194.00	$191,304.00	$9,690,130.00	$29,817,628.00
Proprietors' Income	$85,023.00	$45,366.00	$1,020,023.00	$1,150,412.00
Labor Income	$20,021,217.00	$236,670.00	$10,710,153.00	$30,968,040.00
Other Property Income	$10,803,085.00	$90,192.00	$4,093,668.00	$14,986,945.00
Indirect Business Taxes	$11,542.00	$23,887.00	$1,350,400.00	$1,385,829.00
Employment	860.2	9.8	394.2	1,264.20
Output	$32,000,000.00	$626,970.00	$26,209,525.00	$58,836,495.00

PART III. IMPLAN Model

The IMPLAN Model was run to generate the current Direct, Indirect, and Induced economic activity impact estimates of the SCSC. These impact estimates form the basis of the economic development opportunity costs represented by the SCSC in the region. In other words, the region's economic developers would have to bring in new industries, or grow existing industries, or a combination thereof, with a similar level of economic impacts to replace the SCSC. These "economic development opportunity cost" estimates are presented in Table 2.

PART IV. Scenario Analysis

The opportunity cost estimates in Table 1 form the baseline for the scenario analysis model that was developed using the iDecide software platform from Decisive Tools, Inc. The Influence diagram of the model that was developed is presented in Appendix A. For the analysis, the model was run with 2,500 iterations during the model testing stage, and once the model was validated, 25,000 scenarios were run. The various findings from these runs are presented in Appendix B.

PART V. Discussion of the Findings

a. The Direct, Indirect, and Induced Impacts of the SCSC

The direct, indirect, and induced "economic development opportunity costs" represented by the operations of the SCSC in the study region are attributable to three major sources of economic activity:

1. **Compensation of the Navy and Contractor/Vendor Personnel in the region:**

   The IMPLAN and Scenario Analysis model outputs presented in Tables 1 and 2 show that about a little under half of the economic activity generated is attributable to these employee compensations. This results in a total economic impact of over $47 Million for the region.

2. **Procurements and Products/Services Generated by the Navy and the Contractors/Vendors in the region:**

   Approximately 90% of the "Output" of the SCSC operations in the study area can be attributed to the procurements made and to products/services generated by the military and civilian cost and profit centers related to the SCSC. This results in a total economic impact of over $53 million for the region.

3. **Expenditures by military and civilian transients that come to the SCSC facility for a short duration:**

   The 1000 military and 3000 civilian transients who visit the Navy Command at Wallops Island each year can be likened to very high-value tourists in terms of their economic value to the region. This is due to the very high dollar amounts associated with the defense related activities they perform during their stays. These "visitors" are not seasonal. While their "visits" are "episodic" in nature, their economic value is spread evenly over the year. The total amount of economic activity attributable to these visitors represents over $6 million for the region.

b. A Discussion of the Indirect and Induced Impacts

As discussed earlier in this report, the impacts of the three major sources of economic activity listed above go beyond their direct impacts. In fact, approximately 46% of the total economic activity values presented in the preceding section are attributable to such indirect and induced impacts. The Input-Outputs analysis performed enables us to estimate these additional impacts fairly accurately. Input-output analysis is based on the use of multipliers, which describe the response of an economy to a change in demand or production. Multiplier effects occur as an initial round of spending is spent and re-spent in the State economy. For example, SCSC and contractor/vendor employees receive salary and wages in return for their labor, a portion of which is then spent on goods and services from the region's companies, which in turn becomes income for other workers and supplier firms. Thus, each dollar of spending creates more than one dollar in economic activity, as that spending is earned and, in turn, spent by others in the region. These multipliers are based on the relationship

between locally occurring production by an industry and the use of local inputs, such as labor, supplies. In this instance the annual indirect and induced impacts total almost $50 million for the region.

c. Regional Distribution of the SCSC Economic Activity:

The location of the Wallops facility in Accomack County, Virginia; and the rural nature of Eastern Shore combine to spread the bulk of the economic impact of the SCSC over five counties in Virginia and Maryland. The three counties benefiting most from the SCSC economic impact in Maryland are Wicomico, Worcester, and Somerset. The second Virginia County is Northampton.

1. Accomack County, Virginia:

Understandably, the largest share of the economic activity generated by the SCSC benefits Accomack County, the actual location of the facility. This share exceeds $58 Million per year. In a county with a per capita income figure that is significantly lower than the national average, this dollar amount is equivalent to the total annual income and taxes generated by almost 10% of the county's population.

Chincoteague, Virginia:

Within Accomack county, close to 40% of the economic activity benefits Chincoteague, Virginia. This activity is around $23 Million a year, which can be compared to the economic activity generated by over 2,500 families of four visiting the island for one week in the summer season.

2. Northampton County, Virginia:

While not a significant amount when compared to the other four counties, the over $2 Million in economic value that SCSC represents for Northampton County is the equivalent of the total annual income of almost 130 of the County's residents.

3. **Wicomico County, Maryland:**

   SCSC represents over $25 Million of total economic value to Wicomico County. To put this in perspective, it should be noted that the annual economic activity created by SCSC in Wicomico is equivalent to the economic resources needed to put one fifth of the County's school children through one academic year in the local school system.

4. **Worcester County, Maryland:**

   Worcester benefits to the tune of $24.5 Million per year economically from the proximity of SCSC. To replace this economic activity, Worcester County would have to recruit a company that employs over 250 people at an average of $15 per hour.

   Pocomoke City, Maryland:

   Pocomoke's share of the Worcester County economic activity generated by the SCSC at Wallops comes to $19.6 Million per year. To equal this level of activity, the industrial park in Pocomoke would have to welcome a firm employing about 300 skilled workers at an average of $12 per hour, more than doubling the current capacity utilization...

5. **Somerset County, Maryland:**

   Somerset receives the smallest Maryland share of the SCSC economic activity. Yet, at $3.2 Million per year, this activity would be equal to the resources needed to build over 40 housing units a year at Somerset's current average household unit value rates.

PART VI. Non-Quantifiable Impacts:

Some of the most important impacts of the SCSC at Wallops go beyond mere numbers. These non-quantifiable impacts range from opportunities created for the local workforce to the civic engagement of the military and civilian personnel, and also to the technological and educational benefits that such high-tech facilities afford the region in which they are located.

Another significant non-quantifiable impact is the value of the "Transient" visitors to SCSC for various short-term activities. Because these activities are not seasonal in nature, the economic value they represent is sustained year-round. Some of these impacts are further explored in the following sections of the report.

a. Technology Environment

SCSC activities are on the cutting edge of modern and future warfare systems. All of the counties in the study area are predominantly rural counties. The level and sophistication of the technology being employed at the Wallops Island complex, of which SCSC is an integral part, is significantly above what would have existed had these activities not been a part of the regional economic development fabric. As part of this economic development infrastructure reality, the economic benefits of having high-tech centered employees moving to the Eastern shore in support of the Navy at Wallops Island are obvious. What should be equally obvious is the social value of having these employees and their families raising the regional educational and technology bars through their needs and expectations. These increased education levels—both technical and practical, and the technology experience represented, tend to push up the demand for better education at the local level, as well as better or more technology services availability throughout the region. A perfect example for this is the NASA, NOAA, MARS, and SCSC driven demand for higher education offerings in the region. This demand has resulted not only in enrollment impacts at the Eastern Shore and Wor-Wic Community Colleges, University of Maryland—Eastern Shore, and at Salisbury University, but it has led to the creation of the Old Dominion University Distance Learning Center at the facility as well.

b. Civic Engagement of Personnel:

The SCSC workforce and their dependants are very diverse and boast a very wide variety of geographic and cultural exposure levels, including extensive foreign travel and/or postings. These individuals are also very much a part of the community, serving in leadership roles in youth activities; participating in local volunteer fire companies and rescue squads; taking part in the Partnership for Excellence

program with local schools; and adding to the true meaning of Veteran and Memorial Day activities.

c. The Community Fabric in the Local Towns:

The synergistic value of the SCSC Command becomes evident in the regions towns. Chincoteague, Virginia, and Pocomoke, Maryland define themselves in part through their association with the activities at Wallops Island, of which the SCSC is a vital component. The dynamism and energy brought into these communities by not only the economic activities but also the active participation of the SCSC workforce and their dependants have become of critical importance to the self-image of these towns.

It should be noted that the highly skilled employees who work for SCSC and its vendors are very marketable individuals who enjoy the choice of employment venues. The fact that they choose to live, work, learn, and play in and around Wallops is a credit to the region. In addition, the high levels of compensation enjoyed by these workers contribute to the overall economic development attractiveness of the region in non-quantifiable ways in addition to the obvious economic and fiscal benefits described earlier. One simple example is the stated preference of high-tech relocation specialists for locations that enjoy clusters of highly skilled and highly paid individuals. Not to be forgotten is the clean/green nature of the work being done at SCSC combines the high-pay economic environment with a high-degree of sustainability that would be hard to replace through traditional industry.

Another facet of the community fabric is made up of the spouses of the SCSC and SCSC vendor workforce. These individuals are valuable members of the community, serving as teachers, nurses, and other skilled professionals.

Finally, the presence of the Wallops Island complex, of which SCSC is an integral part, helps reverse the region's "Brain Drain" by affording the area youth numerous work opportunities in well-paid occupations with ample training. These opportunities include entry to skilled office work, skilled trades, and a myriad of professional occupations. With escalating housing prices in the region, such job

opportunities become of critical importance.

PART VII. Future Scenarios

In order to develop credible economic development actions to leverage the presence of the SCSC in the region, local public-policy decision-makers need to examine the potential value of the facility under a number of different scenarios. The Scenario Analysis Model developed for this study, presented earlier in this report in Figure 1, is an ideal tool for accomplishing this objective. Through the use of an "Activity Delta" node in the influence diagram, we are able to examine many different future scenarios. For the purposes of this report, we will examine three such future scenarios. It should be noted, however, that the model is an interactive tool that makes extensive sensitivity analyses very easy to perform. As such, the value of this tool extends beyond the three specific scenarios examined here.

a. Scenario 1:

DD X building, planned to become operational in Jun 2006, projecting a step increase of 45 personnel and adding up to 1,400 additional transients per year.

Using the scenario analysis model, we predict that this particular scenario will lead to the following economic value increases:

Employment Impact:	497 Additional FTEs in the Region's Economy
Value-added:	$18.4 Million More for the Region
Output:	$21.2 Million More for the Region
Total Impact:	$39.6Million More in Total.

b. Scenario 2 (Not Currently Planned but Feasible):

Projecting a 40% increase in AEGIS workload by expanding full operations to include weekends.

Using the scenario analysis model, we predict that this particular scenario will lead to the following economic value increases:

Employment Impact:	193 Additional FTEs in the Region's Economy
Value-added:	$7 Million More for the Region
Output:	$8 Million More for the Region
Total Impact:	$15 Million More in Total.

c. Scenario 3 (Not Currently Planned but Feasible):

Projecting a 40% increase in SSD Facility workload by expanding full operations to include weekends.

Using the scenario analysis model, we predict that this particular scenario will lead to the following economic value increases:

Employment Impact:	97 Additional FTEs in the Region's Economy
Value-added:	$3.5 Million More for the Region
Output:	$4 Million More for the Region
Total Impact:	$7.5 Million More in Total.

PART VIII. Study Limitations

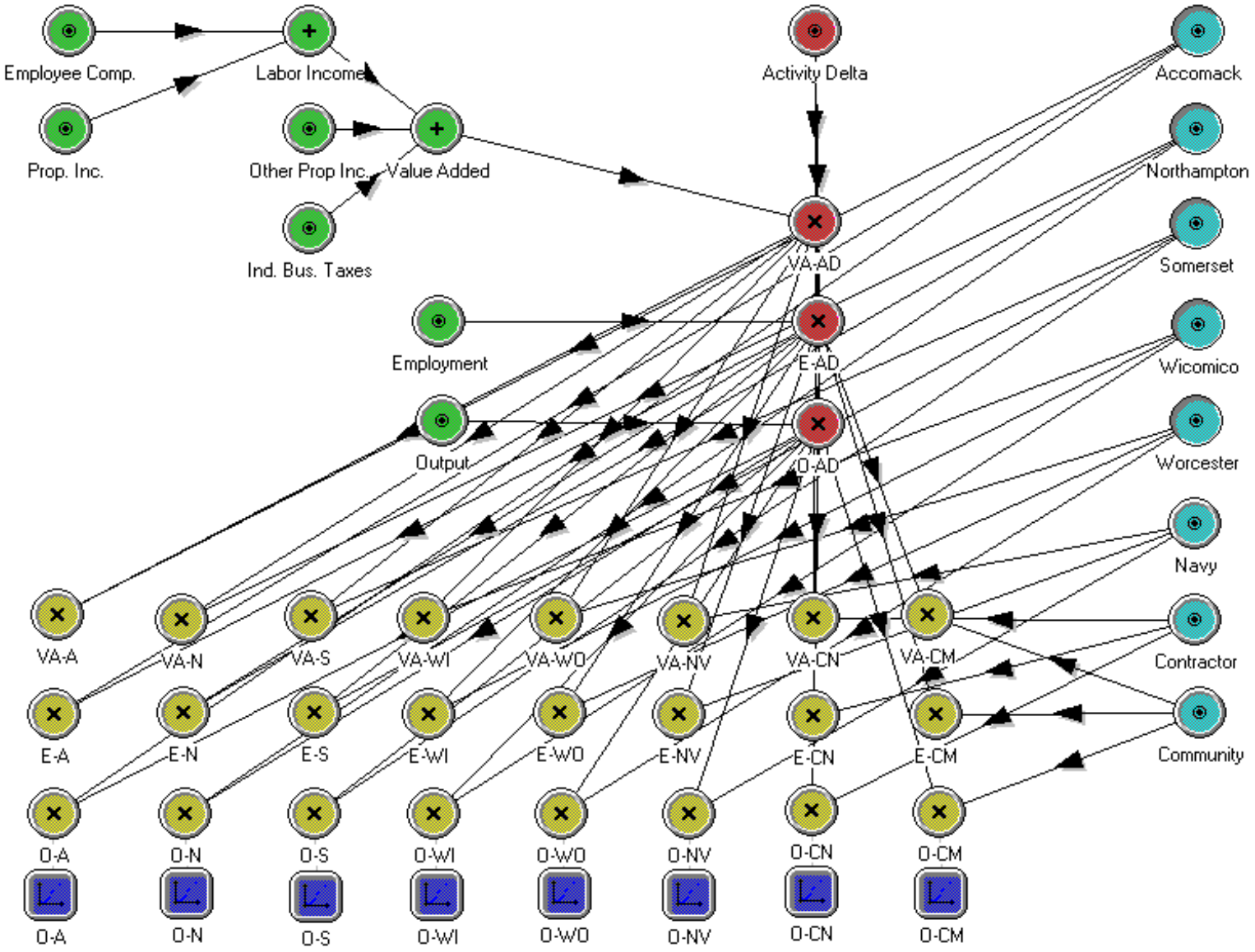
Despite the strengths of I-O analysis there are weaknesses that users should take into consideration. I-O projections, based as they are upon time-specific data, are not dynamic projections. They do not take into account changes that might occur after the specific projection has been completed. I-O models only provide a snapshot of the economy at a given point of time and do not account for any intervening events besides the impact being studied.

The use of a Scenario Analysis Model partially addresses this limitation by providing somewhat dynamic simulations on the basis of random fluctuations in future events under user-defined constraints. Nevertheless, even with the two techniques combined, these forecasts and estimates become less and less robust as time goes by.

Having said all of this, it should be noted that the combination of these tools have in the past yielded predictive accuracy rates of well in excess of 90%

in a three- to five-year time horizon, making the information here highly usable for public policy decision-making purposes.

APPENDIX A: INFLUENCE DIAGRAM FOR THE SCENARIO ANALYSIS MODEL



APPENDIX B: SCENARIO ANALYSIS MODEL OUTPUTS IN PERCENTILES

Name	Base	2.50%	10.00%	50.00%	90.00%	97.50%
O-CM	$ 5,883,649.50	$ 5,883,649.50	$ 5,883,649.50	$ 5,883,649.50	$ 5,883,649.50	$ 5,883,649.50
O-CN	$14,709,123.75	$14,709,123.75	$14,709,123.75	$ 14,709,123.75	$ 14,709,123.75	$ 14,709,123.75
O-NV	$38,243,721.75	$38,243,721.75	$38,243,721.75	$ 38,243,721.75	$ 38,243,721.75	$ 38,243,721.75
O-WO	$13,532,393.85	$11,739,943.81	$12,355,949.65	$ 13,528,347.85	$ 14,704,057.92	$ 15,286,945.16
O-WI	$14,120,758.80	$12,259,948.68	$12,903,453.09	$ 14,120,975.51	$ 15,341,519.08	$ 15,975,960.04
O-S	$ 1,765,094.85	$ 834,743.47	$ 1,156,209.64	$ 1,771,116.71	$ 2,356,349.99	$ 2,699,247.23
O-N	$ 1,176,729.90	$ 286,682.49	$ 599,698.82	$ 1,202,392.56	$ 1,787,238.86	$ 2,081,034.90
O-A	$32,360,072.25	$27,924,216.46	$29,341,172.11	$ 32,267,998.53	$ 35,233,539.59	$ 36,875,040.13
VA-CM	$ 126.40	$ 126.40	$ 126.40	$ 126.40	$ 126.40	$ 126.40
VA-CN	$11,835,203.50	$11,835,203.50	$11,835,203.50	$ 11,835,203.50	$ 11,835,203.50	$ 11,835,203.50
VA-NV	$30,771,529.10	$30,771,529.10	$30,771,529.10	$ 30,771,529.10	$ 30,771,529.10	$ 30,771,529.10
VA-WO	$10,888,387.22	$ 9,446,152.36	$ 9,941,800.82	$ 10,885,131.74	$ 11,831,127.45	$ 12,300,128.14
VA-WI	$11,361,795.36	$ 9,864,556.86	$10,382,331.11	$ 11,361,969.73	$ 12,344,039.21	$ 12,854,520.87
VA-S	$ 1,420,224.42	$ 671,648.36	$ 930,305.34	$ 1,425,069.71	$ 1,895,958.05	$ 2,171,858.83
VA-N	$ 946,816.28	$ 230,669.46	$ 482,527.56	$ 967,464.88	$ 1,438,041.86	$ 1,674,434.99
VA-A	$26,037,447.70	$22,468,284.99	$23,608,390.87	$ 25,963,363.67	$ 28,349,486.90	$ 29,670,265.30
E-CM	126.4	126.4	126.4	126.4	126.4	126.4
E-CN	316	316	316	316	316	316
E-NV	821.6	821.6	821.6	821.6	821.6	821.6
E-WO	290.72	252.21	265.45	290.63	315.89	328.41
E-WI	303.36	263.38	277.21	303.36	329.59	343.22
E-S	37.92	17.93	24.84	38.05	50.62	57.99
E-N	25.28	6.16	12.88	25.83	38.4	44.71
E-A	695.2	599.9	630.34	693.22	756.93	792.2
O-AD	$58,836,495.00	$58,836,495.00	$58,836,495.00	$ 58,836,495.00	$ 58,836,495.00	$ 58,836,495.00
E-AD	1,264.00	1,264.00	1,264.00	1,264.00	1,264.00	1,264.00
VA-AD	$47,340,814.00	$47,340,814.00	$47,340,814.00	$ 47,340,814.00	$ 47,340,814.00	$ 47,340,814.00
Value Added	$47,340,814.00	$47,340,814.00	$47,340,814.00	$ 47,340,814.00	$ 47,340,814.00	$ 47,340,814.00

Activity Delta	1	1	1	1	1	1
Community	0.1	0.1	0.1	0.1	0.1	0.1
Contractor	0.25	0.25	0.25	0.25	0.25	0.25
Navy	0.65	0.65	0.65	0.65	0.65	0.65
Northampton	0.02	0	0.01	0.02	0.03	0.04
Accomack	0.55	0.47	0.5	0.55	0.6	0.63
Worcester	0.23	0.2	0.21	0.23	0.25	0.26
Wicomico	0.24	0.21	0.22	0.24	0.26	0.27
Somerset	0.03	0.01	0.02	0.03	0.04	0.05
Labor Income	$30,968,040.00	$30,968,040.00	$30,968,040.00	$ 30,968,040.00	$ 30,968,040.00	$ 30,968,040.00
Prop. Inc.	$ 1,150,412.00	$ 1,150,412.00	$ 1,150,412.00	$ 1,150,412.00	$ 1,150,412.00	$ 1,150,412.00
Ind. Bus. Taxes	$ 1,385,829.00	$ 1,385,829.00	$ 1,385,829.00	$ 1,385,829.00	$ 1,385,829.00	$ 1,385,829.00
Other Prop Inc.	$14,986,945.00	$14,986,945.00	$14,986,945.00	$ 14,986,945.00	$ 14,986,945.00	$ 14,986,945.00
Employee Comp.	$29,817,628.00	$29,817,628.00	$29,817,628.00	$ 29,817,628.00	$ 29,817,628.00	$ 29,817,628.00
Output	$58,836,495.00	$58,836,495.00	$58,836,495.00	$ 58,836,495.00	$ 58,836,495.00	$ 58,836,495.00
Employment	1,264.00	1,264.00	1,264.00	1,264.00	1,264.00	1,264.00

APPENDIX B: SCENARIO ANALYSIS MODEL OUTPUTS PERECENTILES (Continued)