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Green Data *for a* Growing Green Economy

The Economic Impact of Green Activity in the District of Columbia, Maryland, and Virginia

MARC
Mid-Atlantic Regional Collaborative

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Virginia's Community Colleges Workforce Development

Table of Contents

1. Executive Summary 1
1.1. Overview 1
1.2. Approach 1
1.3. Findings 2

2. Introduction 5
2.1. Overview 5
2.2. Background 5
2.3. Report Outline 6

3. Approach 7
3.1. Methodology 7
3.2. Modeling Approach 8
Identify Model Inputs 8
Conduct Base Impact Modeling 9
Account for Uniqueness of the Green Economy 9
Generate Output 10

4. Findings 11
4.1. Overview of Model Results and Discussion 11
4.2. MARC Region 11
4.3. Sub-region Level Analysis 18
Washington Metropolitan Area 18
District of Columbia 24
Maryland 26
Virginia 28
Workforce Investment Area 30
4.4. Customized Model Results 37
MARC Region 37

5. Conclusion 43

Appendix A: Detailed Modeling Methodology 44
Overview of the IMPLAN Model 44
Additional Detail on Preparing the Data and Modeling Framework 45

Appendix B: IMPLAN Code – NAICS Code Crosswalk 47

Appendix C: Detailed Results by Region 55
MARC Region 55
Washington Metropolitan Area 57
District of Columbia 59
Maryland 61
Virginia 63
WIA Level: Maryland 65
WIA Level: Virginia 77

List of Figures

Figure 1. Green Activity Impacts on Employment in MARC Region 2
Figure 2: Economic Impact Analysis 8
Figure 3. Green Activity Impacts on Employment in MARC Region 13
Figure 4. Green Activity Impacts on Labor Income in MARC Region 14
Figure 5. Green Activity Impacts on GRP in MARC Region 15
Figure 6. Green Activity Impacts on Economic Output in MARC Region 16
Figure 7. Green Activity Impacts on Taxes in MARC Region 16
Figure 8. Green Activity Impacts on Employment by State/Jurisdiction Level 20
Figure 9. Green Activity Impacts on Labor Income by State/Jurisdiction Level 21
Figure 10. Green Activity Impacts on GRP by State/Jurisdiction Level 22
Figure 11. Green Activity Impacts on Economic Output by State/Jurisdiction Level 23
Figure 12. Green Activity Impacts on Taxes by State/Jurisdiction Level 24
Figure 13. Green-Activity Impact on Employment by WIA Level, 2010 31
Figure 14. Green-Activity Impact on Employment by WIA Level, 2012 32
Figure 15. Green-Activity Impact on Labor Income by WIA Level, 2010 33
Figure 16. Green-Activity Impact on Labor Income by WIA Level, 2012 33
Figure 17. Green-Activity Impact on GRP by WIA Level, 2010 34
Figure 18. Green-Activity Impact on GRP by WIA Level, 2012 34
Figure 19. Green-Activity Impact on Economic output by WIA Level, 2010 35
Figure 20. Green-Activity Impact on Economic output by WIA Level, 2012 35
Figure 21. Green-Activity Impact on Tax Revenues by WIA Level, 2010 36
Figure 22. Green-Activity Impact on Tax Revenues by WIA Level, 2012 36
Figure 23. Customized Green Activity Impacts on Employment MARC Region, 2010 38
Figure 24. Customized Green Activity Impacts on Labor Income MARC Region, 2010 39

Figure 25. Customized Green Activity Impacts on GRP MARC Region, 2010 40
Figure 26. Customized Green Activity Impacts on Economic Output MARC Region, 2010 41
Figure 27. Customized Green Activity Impacts on Taxes in MARC Region, 2010 42
Figure 28. Map for Washington Metropolitan Area 46

List of Tables

Table 1. Cumulative Economic Impacts of Green Activity (by State/Jurisdiction) 3
Table 2. Summary of Green Activity Impacts in the MARC Region 12
Table 3. State/Local and Federal Tax Impacts in MARC Region 17
Table 4. Most Impacted Top 10 Industrial Sectors by Employment in MARC Region, 2010 18
Table 5. Summary of Green Activity Impacts in Washington Metropolitan Area 19
Table 6. Summary of Green Activity Impacts in District of Columbia 25
Table 7. Summary of Green Activity Impacts in Maryland 27
Table 8. Summary of Green Activity Impacts in Virginia 29
Table 9. Comparison between Base and Customized Models MARC Region, 2010 37
Table 10. Total Economic Impact of Green Jobs in MARC Region 55
Table 11. State/Local and Federal Tax Impacts in MARC Region 55
Table 12. Most Impacted Top 10 Industrial Sectors by Employment in MARC Region 56
Table 13. Total Economic Impact of Green Jobs in DC Metro Area 57
Table 14. State/Local and Federal Tax Impacts in DC Metro Area 57
Table 15. Most Impacted Top 10 Industrial Sectors by Employment in DC Metro Area 58
Table 16. Total Economic Impact of Green Jobs in District of Columbia 59
Table 17. State/Local and Federal Tax Impacts in District of Columbia 59
Table 18. Most Impacted Top 10 Industrial Sectors by Employment in District of Columbia 60
Table 19. Total Economic Impact of Green Jobs in Maryland 61
Table 20. State/Local and Federal Tax Impacts in Maryland 61

Table 21. Most Impacted Top 10 Industrial Sectors by Employment in Maryland 62
Table 22. Total Economic Impact of Green Jobs in Virginia 63
Table 23. State/Local and Federal Tax Impacts in Virginia 63
Table 24. Most Impacted Top 10 Industrial Sectors by Employment in Virginia 64
Table 25. Total Economic Impact of Green Jobs in Maryland WIA Anne Arundel 65
Table 26. State/Local and Federal Tax Impacts in Maryland WIA Anne Arundel 65
Table 27. Total Economic Impact of Green Jobs in Maryland WIA Baltimore County 66
Table 28. State/Local and Federal Tax Impacts in Maryland WIA Baltimore County 66
Table 29. Total Economic Impact of Green Jobs in Maryland WIA Baltimore City 67
Table 30. State/Local and Federal Tax Impacts in Maryland WIA Baltimore City 67
Table 31. Total Economic Impact of Green Jobs in Maryland WIA Frederick County 68
Table 32. State/Local and Federal Tax Impacts in Maryland WIA Frederick County 68
Table 33. Total Economic Impact of Green Jobs in Maryland WIA Lower Shore 69
Table 34. State/Local and Federal Tax Impacts in Maryland WIA Lower Shore 69
Table 35. Total Economic Impact of Green Jobs in Maryland WIA Mid-Maryland 70
Table 36. State/Local and Federal Tax Impacts in Maryland WIA Mid-Maryland 70
Table 37. Total Economic Impact of Green Jobs in Maryland WIA Montgomery County 71
Table 38. State/Local and Federal Tax Impacts of in Maryland WIA Montgomery County 71
Table 39. Total Economic Impact of Green Jobs in Maryland WIA Prince George's County 72
Table 40. State/Local and Federal Tax Impacts in Maryland WIA Prince George's County 72
Table 41. Total Economic Impact of Green Jobs in Maryland WIA Southern Maryland 73
Table 42. State/Local and Federal Tax Impacts in Maryland WIA Southern Maryland 73
Table 43. Total Economic Impact of Green Jobs in Maryland WIA Susquehanna Region 74
Table 44. State/Local and Federal Tax Impacts in Maryland WIA Susquehanna Region 74
Table 45. Total Economic Impact of Green Jobs in Maryland WIA Upper Shore 75
Table 46. State/Local and Federal Tax Impacts in Maryland WIA Upper Shore 75
Table 47. Total Economic Impact of Green Jobs in Maryland WIA Western Maryland 76

Table 48. State/Local and Federal Tax Impacts in Maryland WIA Western Maryland 76
Table 49. Total Economic Impact of Green Jobs in Virginia WIA I 77
Table 50. State/Local and Federal Tax Impacts in Virginia WIA I 77
Table 51. Total Economic Impact of Green Jobs in Virginia WIA II 78
Table 52. State/Local and Federal Tax Impacts in Virginia WIA II 78
Table 53. Total Economic Impact of Green Jobs in Virginia WIA III 79
Table 54. State/Local and Federal Tax Impacts in Virginia WIA III 79
Table 55. Total Economic Impact of Green Jobs in Virginia WIA IV 80
Table 56. State/Local and Federal Tax Impacts in Virginia WIA IV 80
Table 57. Total Economic Impact of Green Jobs in Virginia WIA VI 81
Table 58. State/Local and Federal Tax Impacts in Virginia WIA VI 81
Table 59. Total Economic Impact of Green Jobs in Virginia WIA VII 82
Table 60. State/Local and Federal Tax Impacts in Virginia WIA VII 82
Table 61. Total Economic Impact of Green Jobs in Virginia WIA VIII 83
Table 62. State/Local and Federal Tax Impacts in Virginia WIA VIII 83
Table 63. Total Economic Impact of Green Jobs in Virginia WIA IX 84
Table 64. State/Local and Federal Tax Impacts in Virginia WIA IX 84
Table 65. Total Economic Impact of Green Jobs in Virginia WIA XI 85
Table 66. State/Local and Federal Tax Impacts in Virginia WIA XI 85
Table 67. Total Economic Impact of Green Jobs in Virginia WIA XII 86
Table 68. State/Local and Federal Tax Impacts in Virginia WIA XII 86
Table 69. Total Economic Impact of Green Jobs in Virginia WIA XIII 87
Table 70. State/Local and Federal Tax Impacts in Virginia WIA XIII 87
Table 71. Total Economic Impact of Green Jobs in Virginia WIA XIV 88
Table 72. State/Local and Federal Tax Impacts in Virginia WIA XIV 88
Table 73. Total Economic Impact of Green Jobs in Virginia WIA XV 89
Table 74. State/Local and Federal Tax Impacts in Virginia WIA XV 89

Table 75. Total Economic Impact of Green Jobs in Virginia WIA XVI 90

Table 76. State/Local and Federal Tax Impacts in Virginia WIA XVI 90

Table 77. Total Economic Impact of Green Jobs in Virginia WIA XVII 91

Table 78. State/Local and Federal Tax Impacts in Virginia WIA XVII 91

1. Executive Summary

1.1. Overview

As part of the Mid-Atlantic Regional Collaborative (MARC) Related Research Project, ICF estimated the total economic impact of the green activity taking place in the District of Columbia, Maryland, and Virginia. We used an input-output model, IMPLAN, to conduct regional economic impact analysis. IMPLAN allows us to estimate the total impact generated by the region's green economy by modeling the successive rounds of spending that result from direct green employment and industry activity in the MARC region. In addition to conducting a base assessment of the current (2010) and projected (2012) green activity, ICF also conducted sensitivity analysis to account for the wage premium associated with green jobs.

1.2. Approach

Input-output analysis estimates the contribution of an economic activity to a regional economy. This analysis estimates the extent to which green activity supports other economic activity at the regional, state, and WIA levels.

Unlike previous studies that estimate the direct impact of green activity based on policy goals or spending allocations, we used primary survey data of current (2010) and projected (2012) green jobs captured by the MARC Regional Employer Survey conducted by ICF. We believe that basing the economic impact analysis on actual employment figures derived from a survey offers greater validity to the estimates. Our analysis reflects the contribution of green workers as defined by the survey[1].

After conducting a baseline estimate of the total economic impact associated with the region's green activity, we conducted sensitivity analysis to account for the uniqueness of green labor based on the premise that there is a wage premium for green skills compared to traditional skills.

Definition of Key Terms:

Direct effects: Primary impact within the industries and their outputs.

Indirect effects: Inter-industry purchases due to new demands of the directly affected sectors by primary industries.

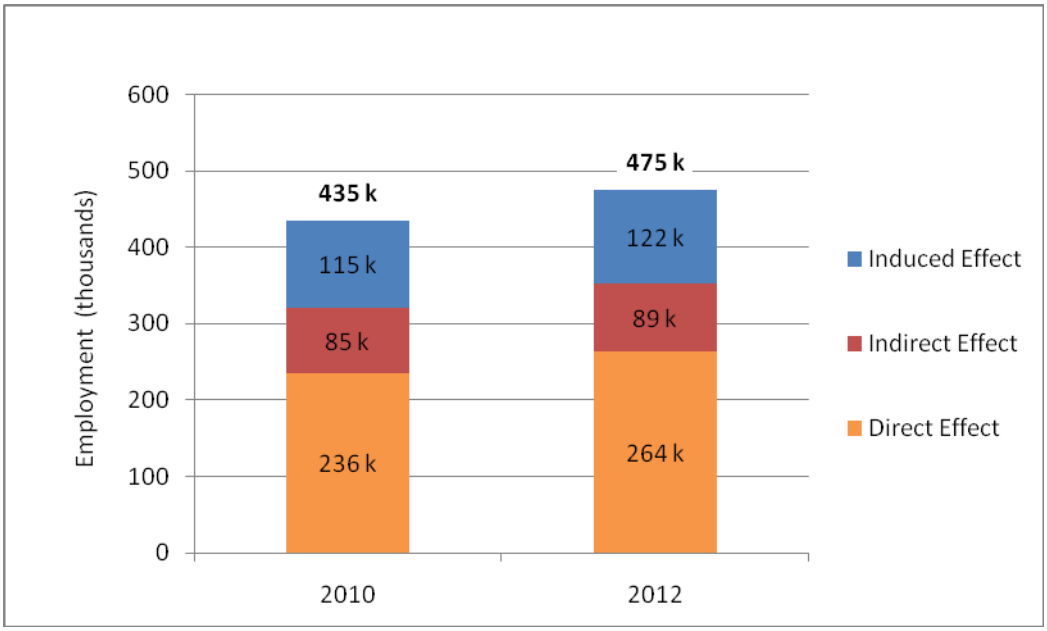
Induced effects: Economy-wide impacts that result from increases in household income and expenditures generated by both the direct and indirect effects.

[1] The definition of green jobs we adopted was based on the output aspect of the definition released by the Bureau of Labor Statistics (BLS) in March 2010. We define green jobs as those that involve any amount of time spent in providing services or producing products in one of the following 7 core areas: (1) Renewable energy and alternative fuels; (2) Energy efficiency and energy conservation; (3) Greenhouse gas reduction; (4) Pollution reduction and cleanup; (5) Recycling and waste reduction; (6) Sustainable agriculture and natural resource conservation; and (7) Education, compliance, public awareness, and training related to green jobs. For more information on the survey or the definition of green jobs, please refer to *Green Jobs in the District of Columbia, Maryland, and Virginia, 2011*.

1.3. Findings

Green activity generates a significant economic impact throughout the MARC region. In addition to creating employment opportunities for jobs directly related to green activity, green activity generates employment opportunities in industries that sell to and buy from green sectors as well as in consumer goods and services. IMPLAN allows us to account for the direct, indirect, and induced impacts. According to our analysis, the total employment impact of green activity in 2010 in the region was 435,300 jobs (see Figure 1, below). This takes into account the 235,600 jobs directly engaged in green activity as well as the 84,600 indirect jobs generated by local purchases and the 115,100 induced jobs in related and consumer industries. The indirect and induced jobs nearly double the direct impact. Specifically, for every green job, 0.85 secondary and tertiary jobs are created.

Figure 1. Green Activity Impacts on Employment in MARC Region



Because of the indirect and induced impacts – the multiplier effect, as green activity increases in the region, the industries that are directly engaged are not the only ones that benefit. Supporting the growth of green industries actually creates new employment opportunities across the economy.

The MARC region had total employment of approximately 5,298,000 in 2010[2]; hence, direct green jobs comprise about 4.5 percent of total employment in the region. However, when taking into account the direct jobs and the multiplier effect, the green sector accounts for 8 percent of employment in the region. The magnitude of these estimates highlights the importance of green job growth not just for the growth of green industries, but for overall regional economic growth.

[2] Bureau of Labor Statistics, 2010: www.bls.gov.

We estimate that in 2010 green and related activity contributed $34.8 billion to the Gross Regional Product (GRP) in the region -- about 4.3 percent of the GRP.

Based on projections of green employment in 2012 reported by the MARC Regional Employer Survey, we estimate that the total impact of green employment in the region will increase by 9 percent to approximately 474,700 jobs.[3] Similarly, we estimate labor income, GRP, economic output, and taxes to increase by an average rate of 6 percent from 2010 to 2012.

Due to differences in the size of the economy and industry mix, impacts at the regional level vary. The DC economy is significantly smaller than the Maryland and Virginia economies and, as a result, does not capture significant multipliers, because up-and down-stream industry spending leaves the District to a larger extent.

Table 1 provides a summary of the total impact on employment, labor income, GRP, and state/local and federal taxes in the MARC region.

Table 1. Cumulative Economic Impacts of Green Activity (by State/Jurisdiction)

State/Jurisdiction	Employment	Labor Income (million $)	GRP (million $)	State GRP* (%)	Tax Revenues (million $)
Current Green Jobs (2010)					
DC Metro	132,000	$8,456	$12,529	-	$3,048
DC	20,000	$2,024	$3,083	3.1	$745
Maryland	205,300	$10,884	$16,267	5.7	$3,754
Virginia	198,700	$9,970	$14,887	3.7	$3,285
Projected Green Jobs (2012)					
DC Metro	150,400	$9,319	$13,716	-	$3,368
DC	21,400	$2,067	$3,136	3.1	$759
Maryland	221,800	$11,322	$16,945	6.0	$3,922
Virginia	219,400	$10,846	$16,196	4.0	$3,611

Note: Contribution toward state GRP based on the 2009 data from www.bea.gov.

We believe that our analysis actually underestimates the true impact of green activity in the region because green jobs most likely provide higher wages than traditional jobs in the same sector. At this time, government data do not track green jobs separately from traditional jobs and, thus, our analysis does not account for their uniqueness. Although there are no quantitative, industry-level data comparing green jobs to traditional industry jobs at this time, several studies provide evidence that there is a wage premium for green labor, especially in industries that are more technical in nature and require a higher level of education or training.

[3] The 9 percent growth rate estimate derived from the survey is consistent with the direct employment growth rate (12 percent) directly reported by the survey data and with the findings reported in the *Greater Washington Initiative*, Regional Report 2010. The projected growth rate is more conservative than in neighboring Pennsylvania that estimates a growth rate of 17 percent for the same time frame, according to the *Pennsylvania Green Job Report*, January 2010. Colorado estimated an 8.2 percent annual growth rate between 1998 and 2007 in *Colorado Green Jobs*, Department of Labor and Employment, Colorado.

We used this evidence to conduct sensitivity analysis on the assumption that green jobs yield a 10 percent wage premium in a selected number of industries. This sensitivity analysis indicates that green activity generates an additional 6,500 jobs and $4 million in tax revenue in the MARC region beyond those reported by the base model. The findings from the sensitivity analysis further highlight the importance of supporting green jobs for regional economic development.

2. Introduction

2.1. Overview

Direct revenue and job creation in green sectors of the economy represent only a fraction of the total impact that a growing green economy can have on a given region. The green economy generates additional benefits, such as increased spending in the industries that support and are supported by green activity, and broader economy-wide benefits from increased consumer spending, among many others.

The total economic benefit of a region's green employment base can be evaluated through regional economic impact analysis that incorporates not only the direct effects of employment in green industries, but also the secondary and tertiary effects caused by economic linkages between industries. This occurs as one industry purchases inputs from other industries and households and then sells outputs to other industries, households, and the government.

In support of Task 4 of the Mid-Atlantic Regional Collaborative (MARC) Related Research Project, the ICF team estimated the total economic impact of the green activity taking place in the District of Columbia, Maryland, and Virginia. For this analysis, we used the IMPLAN model, the most widely used input-output model. The model allows us to estimate the impact generated by the multiplier effect, which captures successive rounds of "ripple" spending resulting from direct employment and industry activity in green sectors of the economy. In addition to conducting a base assessment that used the survey results to generate direct input, the ICF team also conducted sensitivity analysis to account for the wage premium associated with green labor.

We conducted our analysis at the regional, state/jurisdictional, and Workforce Investment Area (WIA) levels for the District of Columbia, Maryland, and Virginia. Using survey data to capture the direct employment impact, we then used the model to analyze the total economic impact of green activity in terms of employment, Gross Regional Product (i.e., value added), labor income, economic output (i.e., industry activity), and tax revenues for each geographic region.

2.2. Background

Established in 2008, the Mid-Atlantic Regional Collaborative (MARC) is recognized by the United States Department of Labor (DOL) Employment and Training Administration as a regional coalition committed to enhancing the regional economic and workforce vitality of the District of Columbia (DC), Maryland, and Virginia (henceforth, collectively referred to as the "MARC Region"). Realizing that green employment and training activities are critical to ensuring the region's ongoing economic growth and competitiveness, the three jurisdictions created the MARC Green Consortium, which comprises the State Workforce Agencies from these three entities. In 2009, the MARC Green Consortium obtained funding from DOL to work with a group of project partners to conduct a study of the green economy in the MARC region by conducting a green jobs survey of regional employers; develop an interactive web-based labor exchange

portal; research related green employment and training issues and policies to supplement survey findings; and conduct broad-based outreach on the process and findings.

The tasks included in the second phase of the project, Related Research, builds on the findings of the green jobs survey to explore broader policy and workforce implications. The objectives of the green activity economic analysis are to (1) Analyze the economy-wide impacts of green activity in the region; (2) Understand industry-specific implications; (3) Anticipate the impact in 2012; and (4) Evaluate regional variation of the economic impact.

2.3. Report Outline

This report provides a detailed account of our modeling exercise to estimate the current (2010) and projected (2012) total impact of green activity in the MARC region. Section 3 presents an overview of our approach, which includes background methodological information on the IMPLAN model and the steps we took to create and run the model. Our detailed findings are presented in Section 4. For regional analysis, we have included the MARC region, DC, Maryland, Virginia, the DC Metro Area, and the WIAs; and provided corresponding results for total estimated employment, labor income, GRP, industry activity, and tax impacts. After presenting the base results for 2010 and 2012, we then report the findings of our customized run which explores a 10 percent wage premium for green labor. Lastly, we end with a brief conclusion. Additional details related to our modeling methodology along with tables of relevant model results appear in the appendix.

3. Approach

Unlike previous studies that estimate the direct impact of green activity based on policy goals or spending allocations, we used primary survey data of current (2010) and projected (2012) green jobs captured by the MARC Regional Employer Survey, conducted by ICF. We believe that this approach -- based on actual employment figures -- offers greater validity to the estimates.

We want to underscore that our analysis reflects the contribution of green workers as defined by the survey. The definition used by the survey was based on the output aspect of the definition released by the Bureau of Labor Statistics (BLS) in March 2010. We define green jobs as those that involve any amount of time spent in providing services or producing products in one of the following 7 core areas: (1) Renewable energy and alternative fuels; (2) Energy efficiency and energy conservation; (3) Greenhouse gas reduction; (4) Pollution reduction and cleanup; (5) Recycling and waste reduction; (6), Sustainable agriculture and natural resource conservation; and (7) Education, compliance, public awareness, and training related to green jobs. For more information on our process to define green jobs, please refer to *Green Jobs in the District of Columbia, Maryland, and Virginia Report, 2011*.

3.1. Methodology

The comprehensive economic impacts of new jobs or investments in the MARC region associated with green activity are complex in nature. Because of the integrated nature of a regional economy, we use economic impact modeling to fully understand how growth in one sector impacts the entire regional economy. For this analysis, ICF used the IMPLAN model.[4]

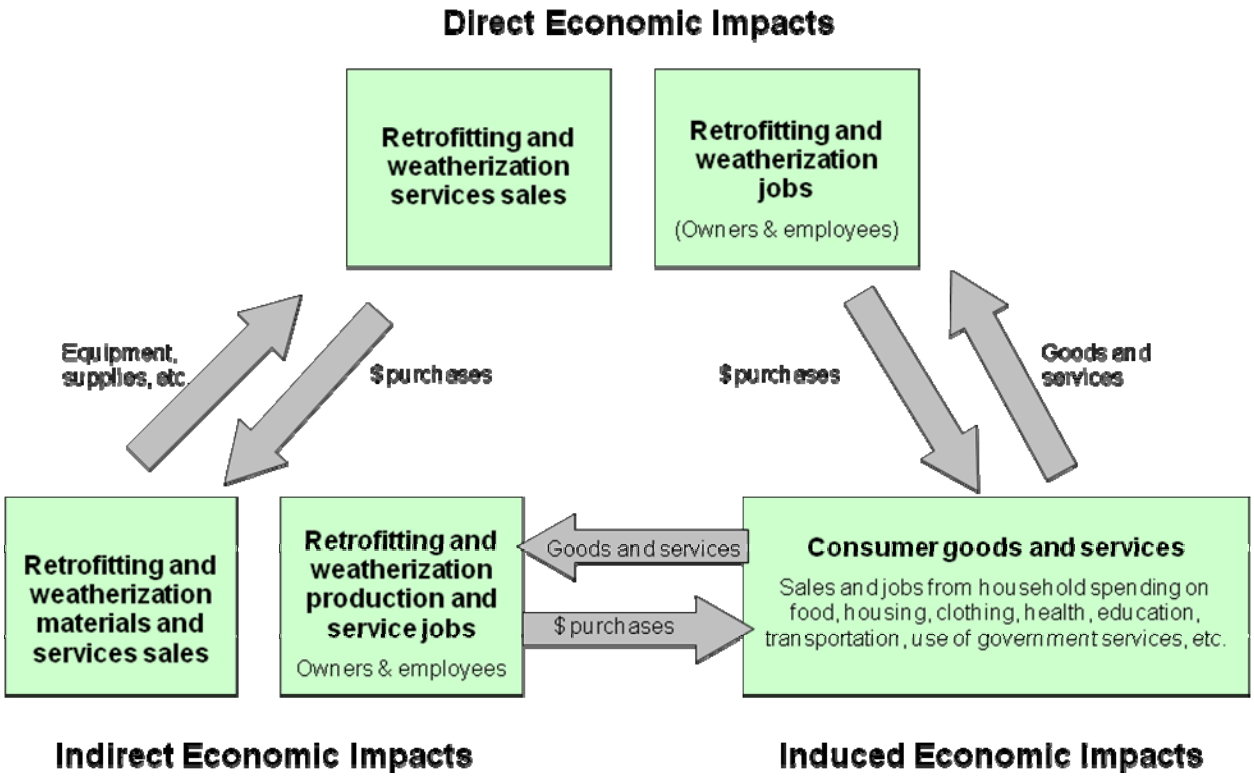
IMPLAN, a proprietary model maintained by the Minnesota IMPLAN Group, is a widely used and effective regional economic analysis model the uses average expenditure data from the industries that originate an impact on supplier industries to trace and calculate the multiple rounds of secondary indirect and induced impacts that remain in the region. Whenever new industry activity or income is injected into a regional economy, it initiates a “ripple” or multiplier effect that creates an economic impact in the region that is often larger than the initial input. The multiplier effect is generated because the recipients of the new income spend some percentage of that new income in the region and the subsequent recipients of that share, in turn, spend some share of it, and so on. The total spending impact of the new activity is the sum of these progressively smaller rounds of spending within the local economy. The total impact of this additional economic activity creates impacts on the GRP, jobs (i.e., the total employment impact), and tax revenues for federal and state/local governments (i.e., the total fiscal impact).

The graphic below (Figure 2) illustrates the relationship between direct, indirect and induced impacts. In this analysis, indirect impacts are generated by spending in the up- and down-stream industries that buy from or sell to the green industry. Induced impacts are then generated across the economy by consumer spending of individuals employed in the direct (green) and indirect sectors. By evaluating the total impact associated with these multiple

[4] See Appendix A, *Detailed Modeling Methodology, Overview of the IMPLAN Model* for more information on the model framework.

rounds of spending, IMPLAN generates impacts associated with employment, industry activity, and corresponding state/local and federal tax revenues in each region or state.

Figure 2: Economic Impact Analysis



In addition, the current version (version 3) of the IMPLAN model includes a multi-region analysis tool that allows for the assessment of regional interactions and, thus, accounts for the impact that spending in one region has on surrounding regions. Because of this inter-regional capability, we were able to capture the ripple effects that occur between the various geographic areas. For example, when we evaluated the economic impact of green jobs in Virginia, its effects in DC and Maryland are captured by the model, thereby generating more comprehensive estimates of the total economic impact in the region.

3.2. Modeling Approach

The following sections provide an overview of our modeling approach; Appendix A provides a more detailed description of our modeling approach.

Identify Model Inputs

At the start of the analysis, it is necessary to create the model by specifying the region of analysis and granularity of assessment and defining the "stimulus" that you are interested in modeling, in this case, the region's green activity. The information characterizing the stimulus being modeled is the direct input; in most cases, this is the number of direct jobs or amount of

industry spending associated with the program, policy, or industry "shock" that is being modeled.

We then used the results of the MARC Regional Employer Survey, conducted by ICF in the summer and fall of 2010, to obtain current (2010) and projected (2012) green employment for each geographic location as the main input into the IMPLAN model. The survey data provided job estimates for each industry sector (NAICS code). We used the IMPLAN – NAICS industry code crosswalk to input the survey data into IMPLAN industry codes. Refer to Appendix A for a detailed account of our approach to converting the survey data into direct input data; refer to Appendix B for the NAICS – IMPLAN crosswalk.

Conduct Base Impact Modeling

Once we prepared the data for input into IMPLAN and constructed the modeling regions, we ran the model at each geographic level -- the MARC region, each state/jurisdiction (DC, Maryland, and Virginia), and each WIA. For the DC, Maryland, and Virginia specifications, we ran each model in a multi-region setting to capture the inter-regional effects that spill over from the other region into that region. We also performed WIA-level runs in a multi-region setting. Thus, the total impacts that we report include spillover effects from neighboring WIAs and significant hub cities that supply or provide the main market for the WIA.

We ran each modeling region twice: first with 2010 data, and then with 2012 data to assess the current and projected impacts of green activity.

Account for Uniqueness of the Green Economy

IMPLAN is an off-the-shelf model and, therefore, is limited by the fact that NAICS codes and subsequent government-collected industry and occupation data do not differentiate between green and traditional industrial sectors. Until the government's industry classifications systems are able to capture the unique industry flows of these nascent green sectors and their unique occupational profiles, any economic impact model that relies on industry trade-flows and labor market information cannot capture the unique character of green jobs in the model's estimates.

To address the uniqueness of the green industrial sectors relative to traditional industry sectors, ICF created a set of customized IMPLAN model runs. We began by reviewing existing studies that addressed the various aspects of green jobs in the U.S. Some studies suggest that green workers may receive a wage premium (i.e., higher income) compared to traditional workers within a given industry, especially in the energy sector.[5] For example, a qualified engineer or a technician could make a higher income in the wind or solar energy industry relative to an otherwise identical worker in a conventional power plant. There is also anecdotal evidence that green builders and designers expect a wage premium in part because of additional training or certification, such as Leadership in Energy & Environmental Design (LEED) training.

[5] Pinderhughes, Rachel, *Green Collar Jobs, 2007*, The City of Berkeley Office of Energy and Sustainable Development; and Copenhagen Consensus Center, 2007, *Defining, Measuring, and Predicting Green Jobs*.

However, green jobs also vary widely from manual construction laborers and waste recycling workers to highly skilled and qualified technicians and professionals. Because of this, wage premiums may not apply to all green jobs. On the other hand, several studies indicate that investments in green sectors create more jobs relative to similar traditional sectors, which lead to higher relative economic impacts throughout the region.[6] All of these studies, however, present the common theme that new green jobs or investments in green sectors may provide higher overall economic benefits relative to jobs or investments in comparable non-green sectors.

Despite this evidence, there is a lack of sector-level quantitative data for wage differences that are required to fully calibrate the model. Therefore, we based the model customization on the assumption that there is a 10 percent wage premium for green labor compared to similar labor in traditional industry sectors. Because there is not enough evidence for green job wage premiums across all industrial sectors, we applied the higher wage premium to only the top 25 industrial sectors out of 155 industrial sectors with green employment in the IMPLAN model. We selected these sectors because they represent the sectors most influenced by the green economy.

Our approach assumes that employers in the various industries compensate green employees at a higher wage rate than traditional workers. This assumption, however, is based on limited quantitative data and anecdotal evidence. Because of a lack of industry-specific data, we applied our approach uniformly to the selected key green industrial sectors only.

Generate Output

For each geographic area included in the analysis, we reported output for the direct, indirect, and induced impacts generated by green industries in terms of employment, labor income, GRP, economic output, and state/local and federal tax revenue.

[6] PERI (Political Economy Research Institute) 2009, *The Economic Benefits of Investing in Clean Energy*; and Kammen, Kapadia, and Fripp, 2004, *Putting Renewables to Work*, RAEL Report, University of California, Berkeley.

4. Findings

The following section presents our impact estimates of green jobs at the regional, state/jurisdictional, and WIA levels.

4.1. Overview of Model Results and Discussion

Green activity has a significant economic impact in the MARC region and has the ability to provide an even greater impact in the future. Employment, income, industry activity, and tax revenue generated by green activity is only a fraction of the total impact that green jobs have on the region. Using the IMPLAN model, we are able to estimate the secondary and tertiary impacts created by up- and down-stream industry spending and consumer purchases.

We present our findings in terms of the direct, indirect, and induced effects of green activity on total regional employment, labor income, GRP, and economic output. We estimated these impacts at the following modeling regions:

- MARC Region
- State/jurisdiction (DC Metro Area, DC, Maryland, and Virginia)
- Workforce Investment Area.

The model results include the economic impacts of the current green jobs for 2010 and the projected green jobs for 2012, as defined by the MARC Regional Employer Survey. The projected green jobs for 2012 may be an underestimate because the survey was conducted during mid-2010 when the economy was experiencing a recession; it is possible that this may have predisposed survey respondents to under-estimate their job growth. In addition, green job growth in 2012 does not include potential future jobs that will result from new businesses and industries moving into the MARC region.

In addition to the base analysis, ICF also customized the IMPLAN model to address the uniqueness of green jobs in the MARC region. We then analyzed the results of the customized model with the base model to evaluate the difference in total economic impact of these jobs earning a wage premium over the corresponding traditional jobs. Because of the lack of quantitative, sector-level data to support this model customization, the results of the sensitivity analysis are considered illustrative of the magnitude of difference between green and traditional activity and may not be a completely accurate portrayal of the true economic situation.

4.2. MARC Region

Overview

Green activity generates a significant economic impact throughout the MARC region. Table 2 provides a summary of the total impacts on employment, labor income, GRP, economic output, and state/local and federal taxes. Additional details on the direct, indirect, and induced effects of green activity in the MARC region are presented in Appendix C, Table 10.

We estimated the total economic impacts for current green jobs in 2010 and projected green jobs in 2012. The cumulative impact of green activity on employment in 2010 was 435,300, and we estimate that it will increase by 9 percent to 474,700 in 2012.[7] In addition, we estimate that labor income, GRP, economic output, and taxes will increase by an average of 6 percent from 2010 to 2012.

Table 2. Summary of Green Activity Impacts in the MARC Region

Description	Total Impact (Direct, Indirect, Induced)	
	2010	2012
Employment ('000 jobs)	435.3	474.7
Labor Income (billion 2010$)	$23.3	$24.7
GRP, Value added (billion 2010$)	$34.8	$37.0
Economic Output (billion 2010$)	$62.1	$65.7
Tax Revenues (billion 2010$)		
State/Local Tax	$3.6	$3.8
Federal Tax	$4.6	$4.8

In addition to the industries that are directly affected by green jobs, some additional industries will also be greatly affected by an increase in green activity. These industries are typically in up- or down-stream industries that sell to or buy from the green sectors or consumer goods industries that benefit from the increased income that a growth in green jobs might bring. The five sectors that gain the most from MARC region green activity are as follows:

- Construction
- Architectural, engineering and related services
- Wholesale trade businesses
- Other support services, and
- Food services and drinking places.

These top five industries represent a mix of industries directly affected by green employment (construction and architecture/engineering services), those indirectly affected (construction, architecture/engineering services, wholesale trade), and those affected by induced impacts

[7] The 9 percent growth rate estimate derived from the survey is consistent with the direct employment growth rate (12 percent) directly reported by the survey data and with the findings reported in the *Greater Washington Initiative*, Regional Report 2010. The projected growth rate is more conservative than in neighboring Pennsylvania that estimates a growth rate of 17 percent for the same time frame, according to the *Pennsylvania Green Job Report*, January 2010. Colorado estimated an 8.2 percent annual growth rate between 1998 and 2007 in *Colorado Green Jobs*, Department of Labor and Employment, Colorado.

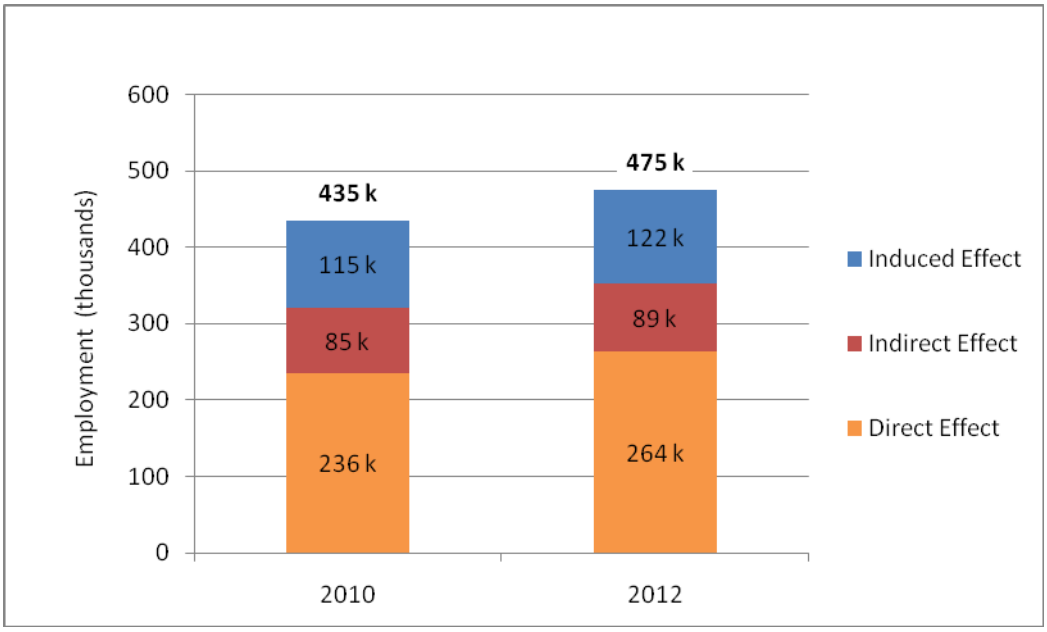
(wholesale trade, support services and food/drinking establishments). Detailed model results for direct, indirect, induced impacts are provided in Table 10, in Appendix C.

The following sub-sections provide greater detail on the impacts on each output theme: employment, labor income, GRP, economic output, and tax revenue.

Employment

Figure 3 illustrates the relationship between direct, indirect, and induced employment impacts. Again, the direct impact value was determined from green employment data captured by the MARC Regional Employer Survey. The indirect impacts represent the jobs created in related industries that, due to increased demand from the green activity, are supplying goods and services. When jobs are created in directly and indirectly related green sectors, household incomes and consumer expenditures increase in the region, creating more jobs.

Figure 3. Green Activity Impacts on Employment in MARC Region



The number of jobs created by the combined indirect and induced impacts is almost equal to the number of direct green jobs. In the MARC region, green jobs have a multiplier of 1.85, suggesting that for every green job, 0.85 secondary and tertiary jobs are created.

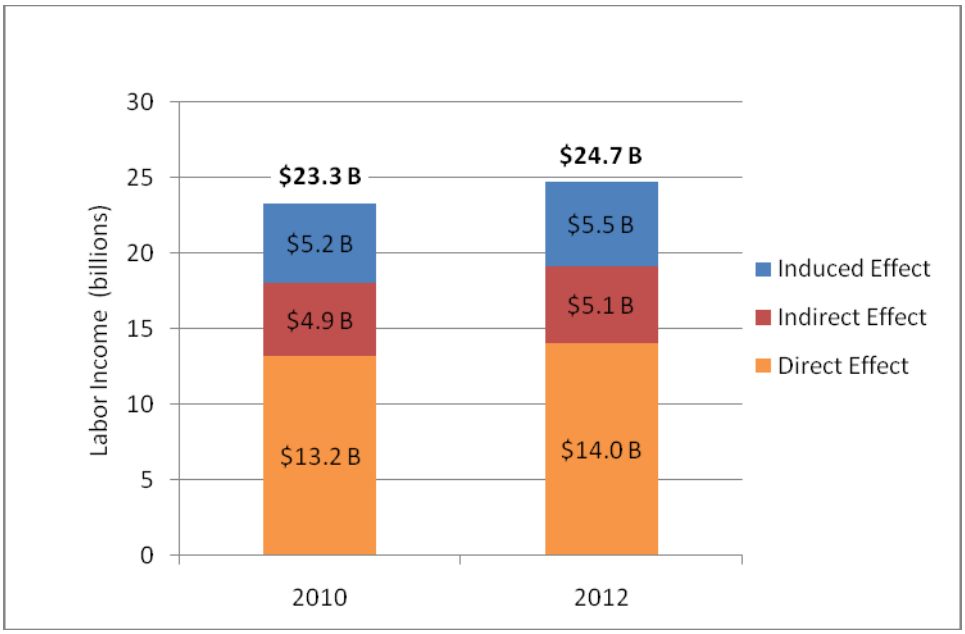
The total number of green jobs in the MARC region (from the survey data) is approximately 235,600. This represents the direct impact in the model (Figure 3). The MARC region had a total employment of 5,298,000 in 2010[8], which amounts to about 4.5 percent of total employment. However, the total number of jobs created in the MARC region as a result of green activity is approximately 435,000 -- 8 percent of the regional labor force.

[8] Bureau of Labor Statistics, 2010: www.bls.gov.

Labor Income

Figure 4 illustrates the direct, indirect, and induced effects of green activity on labor income. Consistent with the higher number of jobs in the region, the labor income also increases significantly as a result of green activity. Direct labor income represents about 57 percent of total labor income, while the remaining 43 percent comes from indirect and induced labor income.

Figure 4. Green Activity Impacts on Labor Income in MARC Region

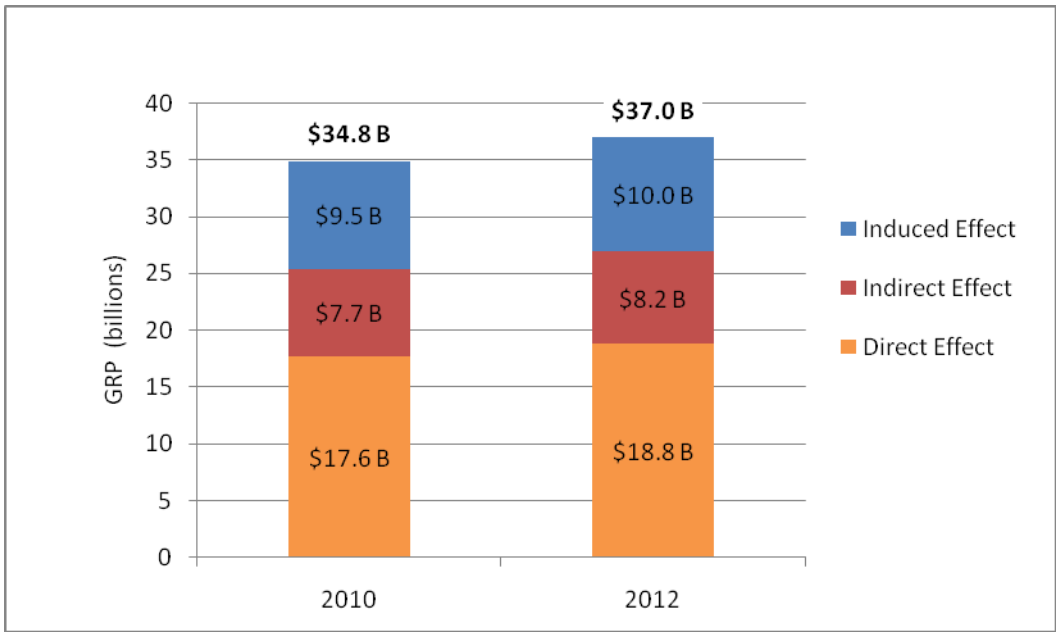


Gross Regional Product (Value Added)

The Gross Regional Product (GRP) equals the economic output minus the value of the industrial inputs, such as raw materials, semi-finished goods, and other services purchased from domestic industries or foreign sources. Figure 5 illustrates the direct, indirect, and induced effects of green activity on GRP. Unlike employment and labor income, where the contribution from direct impact is slightly higher than the combined indirect and induced impacts, about 50 percent of the GRP comes from indirect and induced impacts. The GRP increase that results from the 2010 green activity contributes about 4.4 percent to the overall GRP in the MARC region.[9]

[9] According to 2009 Bureau of Economic Analysis data, the Gross Regional Product of the MARC region was $789.3 billion (source: www.bea.gov).

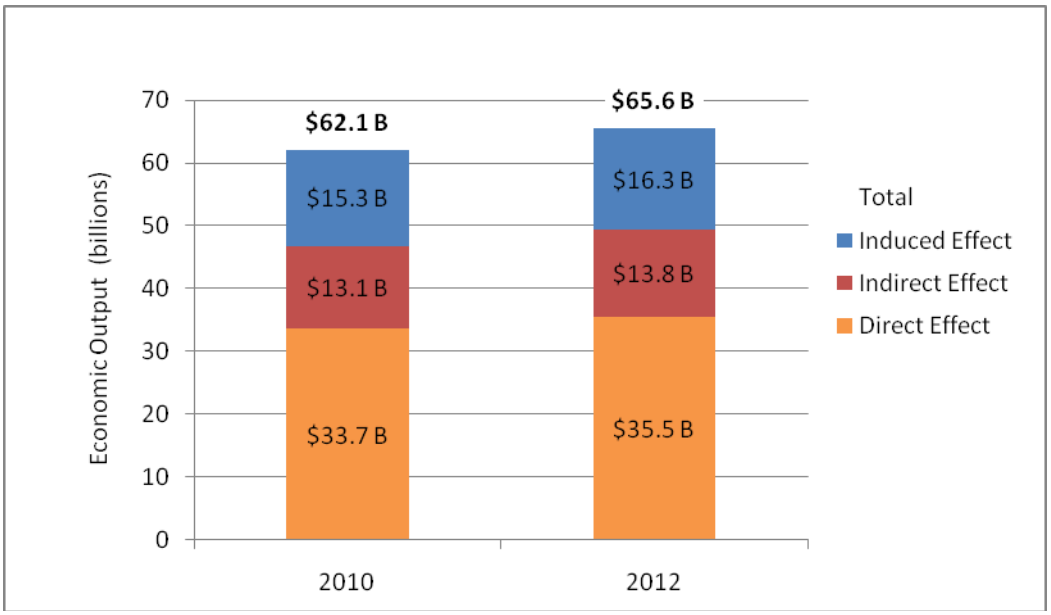
Figure 5. Green Activity Impacts on GRP in MARC Region



Economic Output

Figure 6 illustrates the direct, indirect, and induced effects of green activity on economic output. Economic output represents the value of industry production, including inter-industry purchases of intermediate goods, raw materials, cost for energy, and other inputs. For manufacturing sectors, economic output includes total sales with inventory change. For service sectors, economic output is equal to total sales. For retail and wholesale trade, output is equal to gross margin. The indirect and induced impact of green activity on economic output is at a consistent ratio to GRP (and comparable multipliers).

Figure 6. Green Activity Impacts on Economic Output in MARC Region



Tax Impacts

Green activity has a significant impact on tax revenues in the MARC region. Of the $8.1 billion generated in 2010 by green activity, about 45 percent represents state/local taxes, and the remaining 55 percent represents federal taxes (Figure 7). A detailed presentation of local, state, and federal taxes is provided in Table 3.

Figure 7. Green Activity Impacts on Taxes in MARC Region



Table 3. State/Local and Federal Tax Impacts in MARC Region

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$63	$0	$2,089	$881	$522
Federal Tax	$2,268	$111	$214	$1,594	$375
Projected Green Jobs (2012)					
State and Local Tax	$67	$0	$2,275	$934	$551
Federal Tax	$2,405	$118	$233	$1,690	$395

In addition to assessing how green activity affects the regional economy as a whole, it is important to understand the industry-specific impacts. It is clear that green sectors stand to grow from an expected increase in green activity. What is less clear, however, is how green activity affects related industries. The data presented in Table 4 suggests that the construction sector gains the most in terms of employment, labor income, GRP, and economic output in the MARC region. This construction sector not only gains from direct green activity, but also from indirect activity, such as construction catalyzed by new green activity and from induced activity as increased personal income and consumer spending causes additional residential and commercial development. The architectural and engineering sectors and the wholesale trade sector also gain significantly from the direct, indirect, and induced effects. Support services and food and drinking establishments gain the most from indirect and induced activity.

Table 4. Most Impacted Top 10 Industrial Sectors by Employment in MARC Region, 2010

(million 2010$)

Sector	Description	Employment (in '000)	Labor Income	GRP	Economic Output
	Impacts from Current Green Jobs in 2010				
34	Construction Super Sector	64.5	$3,261	$3,829	$8,147
369	Architectural, engineering, and related services	23.1	$1,975	$2,086	$3,309
319	Wholesale trade businesses	20.3	$1,670	$2,877	$4,209
389	Other support services	18.9	$606	$1,130	$1,789
413	Food services and drinking places	17.6	$412	$580	$1,085
391	Private elementary and secondary schools	13.8	$481	$479	$666
360	Real estate establishments	13.5	$237	$1,772	$2,387
432	Other state and local government enterprises	13.2	$886	$1,005	$3,470
425	Civic, social, professional, and similar organizations	9.9	$616	$621	$872
329	Retail Stores - General merchandise	7.5	$205	$333	$274

For industry specific impacts for 2012 data, refer to Appendix C, Table 12.

4.3. Sub-region Level Analysis

The following sections of the report present the results of our estimates of employment, labor income, GRP, economic output, and tax impacts in each geographic region.

Washington Metropolitan Area

Overview

Green activity is highly concentrated in the DC Metro Area.[10] Even though it is geographically smaller than Maryland or Virginia, the total economic impact of green activity in the DC Metro area is comparable with both states (Figure 8-12) because DC Metro includes some of the key economic regions in the entire MARC region. A summary of the cumulative economic impact in the DC Metro area is provided in Table 5. The detail economic impacts for direct, indirect, and induced effects of green activity are summarized in Figure 8-12. For additional detail, please see Appendix C (Table 13).

[10] The Washington DC Metropolitan Area includes District of Columbia; Calvert, Charles, Frederick, Montgomery, and Prince George counties in Maryland; and Arlington, Clarke, Fairfax, Fauquier, Frederick, Loudoun, Prince William, Spotsylvania, Stafford and Warren counties in Virginia; and Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, and Manassas Park Cities in Virginia (see Figure 28 in the Appendix for a map).

Table 5. Summary of Green Activity Impacts in Washington Metropolitan Area

Description	Total Impact (Direct, Indirect, Induced)	
	2010	2012
Employment (jobs)	132,000	150,400
Labor Income (million $ 2010)	$8,460	$9,320
GRP, Value added (million $ 2010)	$12,530	$13,720
Economic Activity (million $ 2010)	$20,970	$22,840
Tax Revenues (million 2010$)		
State/Local Tax	$1,400	$1,550
Federal Tax	$1,650	$1,810

Total employment increases by about 14 percent from 2010 to 2012, a growth rate that exceeds that of the MARC region where we estimated growth at approximately 9.1 percent. This difference is due to the fact that a significant portion of the MARC region's green-related sectors are concentrated in this area. The top five most affected green sectors in the DC Metro area are as follows:

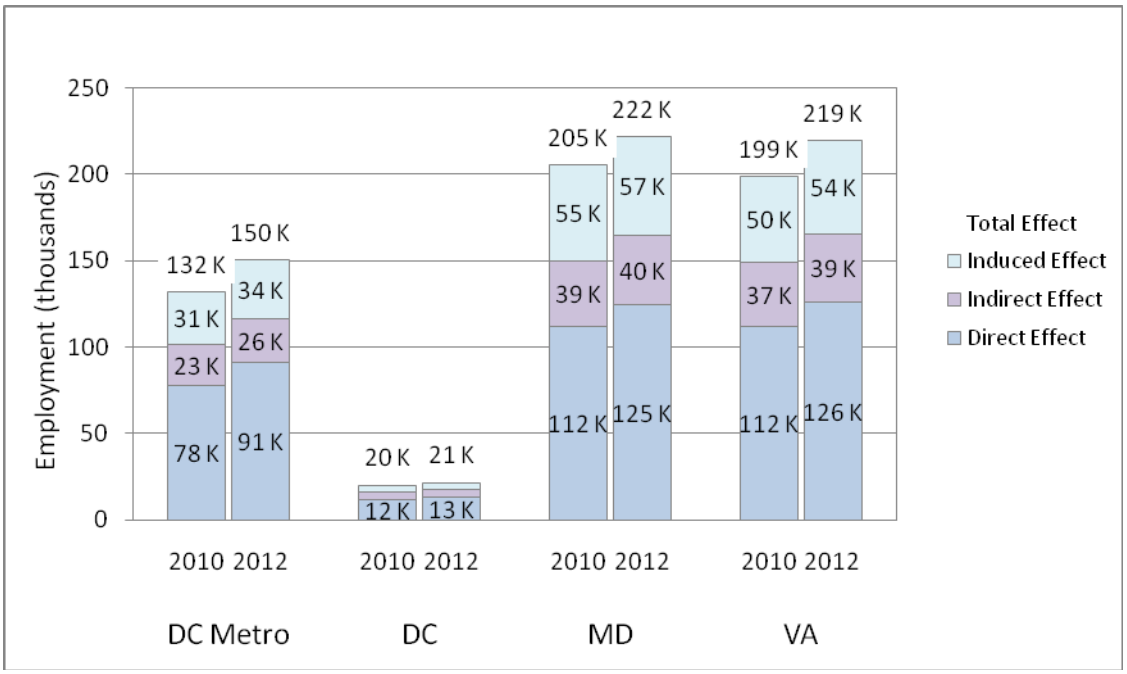
- Construction
- Architectural, engineering and related services
- Other Support services,
- Civic, social, professional and similar organizations, and
- Food services and drinking places.

In contrast to the MARC region as a whole, the civic, social, professional and similar organizations sector becomes more important in the DC Metro area. This is likely to reflect the prominence of Washington, DC and an economy dominated by professional service sectors and political organizations. The remaining top ten industrial sectors in 2010 and 2012 are presented in Appendix C.

Employment

Figure 8 presents the direct, indirect, and induced impacts of green activity on employment in the DC Metro area. DC Metro has an employment multiplier of 1.70 for the combined indirect and induced impact (compared to 1.85 in the MARC region). This lower multiplier can be attributed to the fact that smaller regions have lower multipliers as some of the up and down-stream spending "leaks" out of the region.

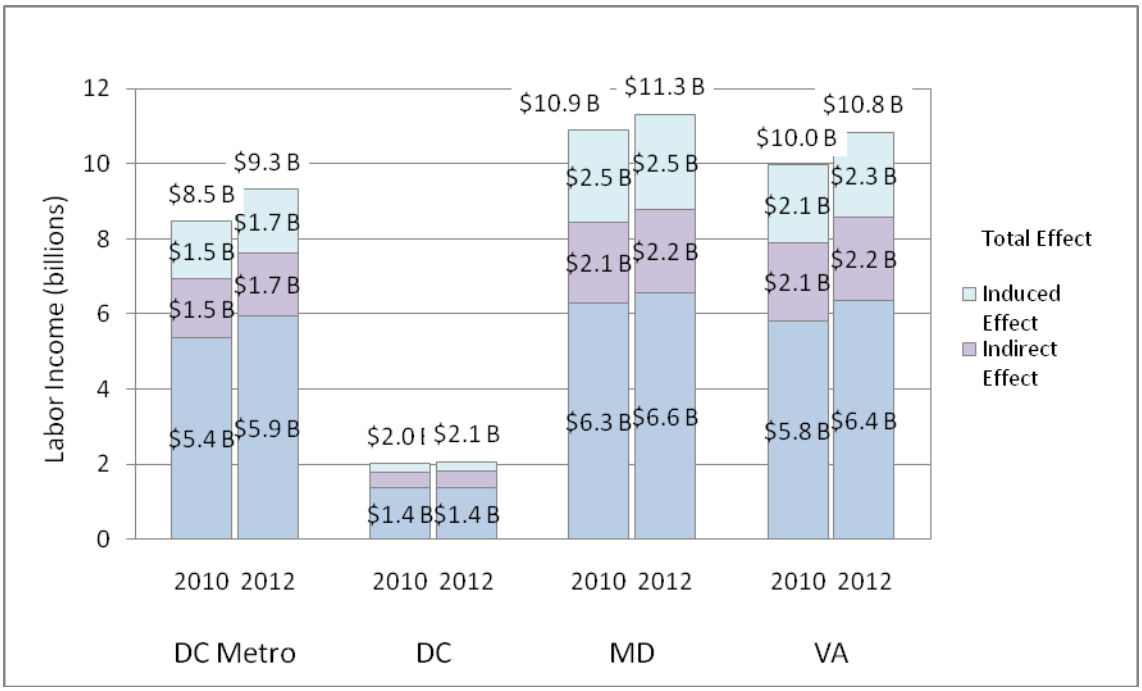
Figure 8. Green Activity Impacts on Employment by State/Jurisdiction Level



Labor Income

Figure 9 illustrates the direct, indirect, and induced effects of green activity on labor income. Consistent with the number of jobs in the DC Metro area, labor income also increases significantly due to green activity. Direct labor income represents about 64 percent of total labor income, while the remaining 36 percent comes from the indirect and induced impacts of labor income.

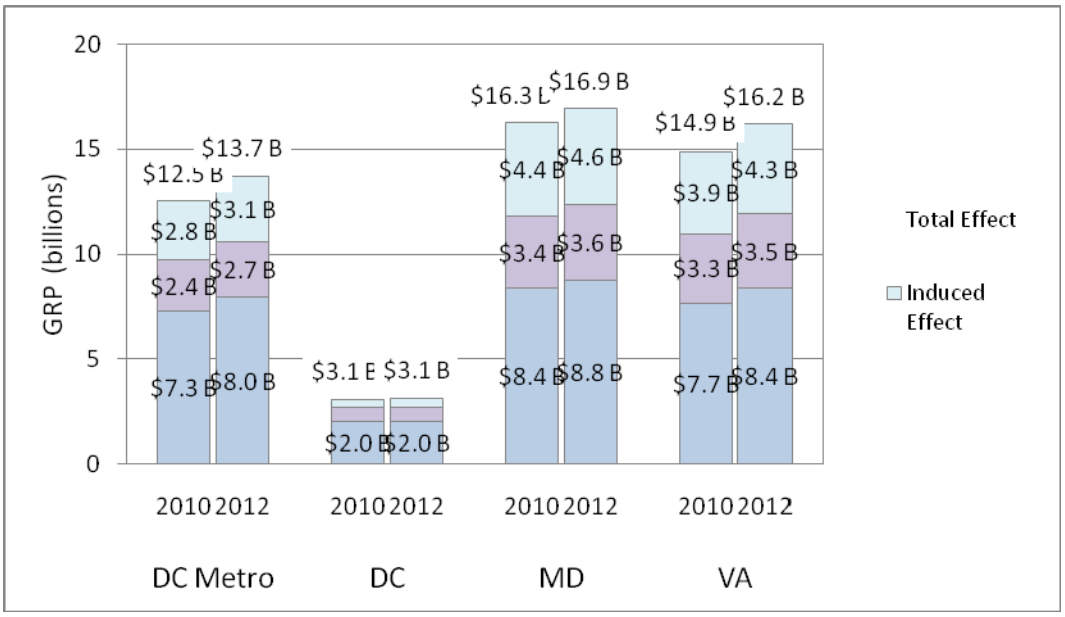
Figure 9. Green Activity Impacts on Labor Income by State/Jurisdiction Level



Gross Regional Product (Value Added)

The direct, indirect, and induced effects of green activity on GRP in the DC Metro area are presented in Figure 10. The DC Metro GRP multiplier is 1.7 (compared to 1.98 for the MARC region). Again, this is likely a result of the smaller size of the DC Metro economy relative to the MARC region as a whole.

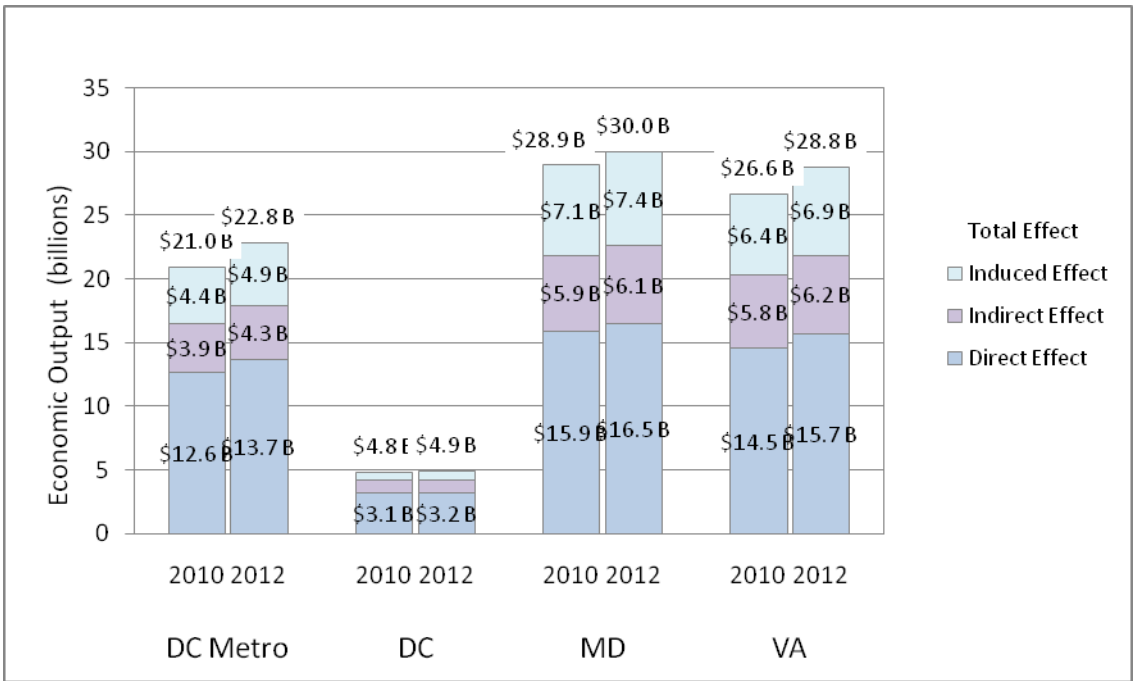
Figure 10. Green Activity Impacts on GRP by State/Jurisdiction Level



Economic Output

The direct, indirect, and induced effects of green activity on economic output in the DC Metro Area are presented in Figure 11. Compared to GRP, economic output represents the value of industry production, including inter-industry purchases of intermediate goods, raw materials, the cost of energy, and other inputs. The indirect and induced impact of green activity on economic output is at roughly the same ratio as GRP and follows a similar trend across regions.

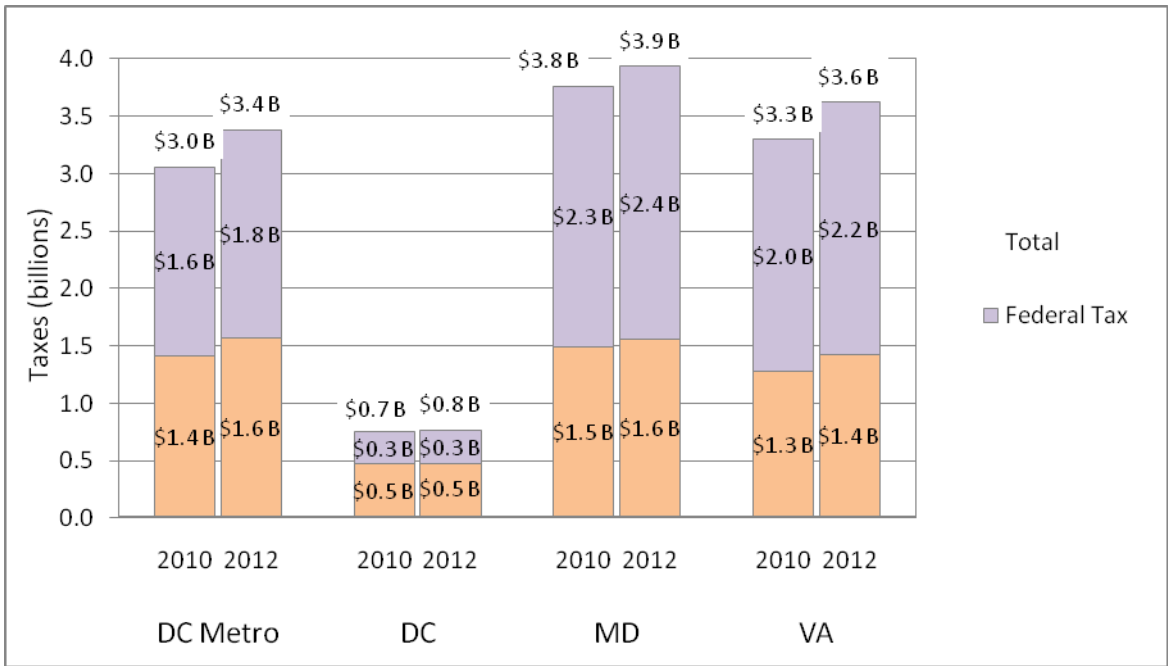
Figure 11. Green Activity Impacts on Economic Output by State/Jurisdiction Level



Tax Impacts

Green activity has a significant impact on tax revenues in the DC Metro area. Of the $3 billion generated in 2010, about 46 percent represents state/local taxes and the remaining 54 percent represents federal taxes (Figure 12). A detailed description of local, state, and federal taxes is provided in Appendix C (Table 14).

Figure 12. Green Activity Impacts on Taxes by State/Jurisdiction Level



District of Columbia

Overview

The DC economy and its green sectors are dominated by public and not-for-profit organizations and technical and professional services. DC's relatively smaller impact results from its smaller economy. Thus, a significant portion of its up- and down-stream purchases and income "leak" to neighboring states. Moreover, about 14 percent of DC's total economic impact comes from Maryland and Virginia spillover effects. DC receives significantly more spillover than both Maryland or Virginia again because of DC's small size which necessitates economic linkages with neighboring states and the fact that it is one of the key central cities in the region and a major hub of economic activity for Maryland and Virginia.

A summary of the cumulative economic impact of green activity on employment, labor income, GRP, economic output, and state/local and federal taxes is presented in Table 6 below. Further detail on the direct, indirect, and induced effects of green activity in Maryland can be found in Appendix C (Table 22).

Table 6. Summary of Green Activity Impacts in District of Columbia

Description	Total Impact (Direct, Indirect, Induced)	
	2010	2012
Employment (jobs)	20,000	21,400
Labor Income (million $ 2010)	$2,020	$2,070
GRP, Value added (million $ 2010)	$3,080	$3,140
Economic Activity (million $ 2010)	$4,830	$4,900
Tax Revenues (million 2010$)		
State/Local Tax	$460	$470
Federal Tax	$285	$290

The cumulative impact of green activity on DC employment in 2010 was 20,000. We estimate that employment will increase by 7.3 percent to 21,400 in 2012. Labor income, GRP, economic output, and taxes, on the other hand, are expected to increase only by an average rate of 2 percent from 2010 to 2012. DC's GRP and economic output impacts also increase at a much lower rate relative to Maryland and Virginia because of the relative small size of the DC economy.

In addition to the industries that are directly affected by green jobs, additional industries will be greatly affected by an increase in green activity. The five industrial sectors that gain the most from green activity in DC are as follows:

- Civic, social, professional and similar organizations
- Medical and diagnostic labs, outpatient services
- Architectural, engineering and related services
- Private junior colleges, colleges and universities, and
- Advertising and related services.

These industries represent a mix of sectors with direct green jobs and those mainly affected by indirect and induced impacts. In contrast to the MARC region as a whole, the civic, social, professional, and similar organizations sectors become more important in DC. The top ten industrial sectors in 2010 and 2012 are presented in Appendix C (Table 18).

Employment

The direct, indirect, and induced impacts of green activity on employment in DC are provided in Figure 8 (above) and also in Table 16 in Appendix C. The number of jobs created by the combined indirect and induced impact is almost equal to the number of direct green jobs. DC has an employment multiplier of 1.7 for the combined indirect and induced impact (compared to 1.85 in the MARC region, but similar to DC Metro area). Again, this is the result of the relative small size of the DC economy.

There are 12,000 green jobs in DC (from the survey data) compared to a total employment of 447,200 in 2010[11]; hence, the direct green jobs constitute about 2.7 percent of total employment. According to our findings, there are 20,000 total jobs in DC associated with green activity (including indirect and induced), which makes up 4.5 percent of the labor force.

Labor Income

Figure 9 (above) shows the direct, indirect, and induced effect of green activity on labor income. Consistent with the number of jobs in DC, labor income also increases significantly due to green activity. Direct labor income represents about 67 percent of total labor income, while the remaining 33 percent comes from the indirect and induced impacts of labor income. The percentage of direct labor income in DC is higher than in both Maryland and Virginia because of the higher concentrations of technical and service-oriented sectors.

Gross Regional Product (Value Added)

The direct, indirect, and induced effects of green activity on GRP in DC are presented in Figure 10 (above). The GRP multiplier is only 1.5 for DC (compared to 1.98 for the MARC region). In addition, DC's GRP multiplier is lower than its employment multiplier (1.7). The $3.1 billion in green activity-related GRP contributes about 3.1 percent to the total GRP in DC.[12]

Economic Output

The direct, indirect, and induced effects of green activity on economic output in DC are presented in Figure 11 (above). The indirect and induced impact of green activity on economic output is at approximately the same ratio as GRP. In addition, they have comparable multipliers.

Tax Impacts

Green activity has a significant impact on tax revenues in DC. Of the $700 million revenues generated in 2010, about 62 percent represents state/local taxes, and the remaining 38 percent represents federal taxes (Figure 12 – above). A detailed description of local, state, and federal taxes is provided in Appendix C (Table 17).

Maryland

Overview

Maryland is comparable to Virginia in its green sector mix and activity volume. Thus, it is not surprising that they have similar economic impacts. Maryland has smaller spillover effects relative to DC. This is because Maryland is larger and businesses and industries are more likely to trade within the state. Only about 4 percent of Maryland's total economic impact can be attributed to spillovers from DC and Virginia.

A summary of the cumulative economic impact of green activity on employment, labor income, GRP, economic output, and state/local and federal taxes is presented in Table 7. Further detail

[11] Bureau of Labor Statistics, 2010: www.bls.gov.

[12] According to 2009 Bureau of Economic Analysis data, the Gross Regional Product of DC was $99.2 billion (source: www.bea.gov).

on the direct, indirect, and induced effects of green activity in Maryland can be found in Appendix C (Table 22).

Table 7. Summary of Green Activity Impacts in Maryland

Description	Total Impact (Direct, Indirect, Induced)	
	2010	2012
Employment (jobs)	205,000	221,800
Labor Income (million $ 2010)	$10,880	$11,320
GRP, Value added (million $ 2010)	$16,270	$16,950
Economic Activity (million $ 2010)	$28,950	$30,010
Tax Revenues (million 2010$)		
State/Local Tax	$1,480	$1,550
Federal Tax	$2,280	$2,370

The total 2010 impact of green activity on employment in Maryland was approximately 205,000. We estimate that employment will increase in 2012 by about 8 percent to 222,000. Labor income, GRP, economic output, and taxes, on the other hand, are expected to increase by an average rate of only 4 percent from 2010 to 2012. The indirect and induced impacts of green activity in Maryland are higher than in DC but slightly lower than in Virginia (again, likely a results of the size of the economy).

The five industrial sectors that gain the most from green activity in Maryland are as follows:

- Construction
- Other support services
- Wholesale trade businesses
- Architectural, engineering and related services, and
- Other state and local government enterprises.

In contrast to DC, but similar to Virginia, the construction sector is prominent in Maryland. The top ten industrial sectors in 2010 and 2012 affected by green activity and their corresponding economic impacts on employment, labor income, GRP and economic output are presented in Appendix C (Table 21).

Detailed model results for direct, indirect, induced impacts, and taxes are provided in Appendix C (Table 20).

Employment

The direct, indirect, and induced impacts of green activity on employment in Maryland are provided in Figure 8 (above) and also in Table 16 in Appendix C. The number of jobs created by the combined indirect and induced impacts contributes about 45 percent to the total jobs generated by green activity. Maryland has an employment multiplier of 1.84 for the combined

indirect and induced impacts (nearly identical than for the MARC region but higher than the multipliers for DC and the DC Metro Area).

There were 112,000 green jobs in Maryland in 2010 (from the survey data). The total employment in Maryland was 1,985,000 in 2010[13]; hence, direct green jobs make about 5.6 percent of total employment in the state. However, the total number of jobs associated with green activity is 205,000 -- 10.3 percent of Maryland's total labor force.

Labor Income

Figure 9 (above) illustrates the direct, indirect, and induced effects of green activity on labor income. Consistent with the number of jobs in Maryland, the labor income also increases proportionally due to green activity. Direct labor income represents about 58 percent of total labor income, while the remaining 42 percent comes from the indirect and induced impacts of labor income. The percentage of direct labor income in Maryland is similar to Virginia but lower than for DC. This could result from the existence of a metropolitan wage premium in DC or a higher concentration of lower-wage industry/construction sectors compared to technical and service oriented sectors in DC.

Gross Regional Product (Value Added)

The direct, indirect, and induced effects of green activity on GRP in Maryland are presented in Figure 10 (above). The GRP multiplier is 1.94 for Maryland, relatively close to the 1.98 multiplier for the entire MARC region. The $16.3 billion in GRP related to green activity contributes about 5.7 percent to the total Maryland GDP in 2010.[14]

Economic Output

The direct, indirect, and induced effects of green activity on economic output in Maryland are illustrated in Figure 11 (above). The indirect and induced impacts of green activity on economic output are at roughly the same ratios than for the GRP, and they have comparable multipliers. The GRP and economic output findings in Maryland are similar to that in Virginia reflecting a similarity in the structure and size of their green economies.

Tax Impacts

Green activity has a significant impact on tax revenues in Maryland. Of the $3.8 billion generated in 2010, about 39 percent represents state/local taxes, and the remaining represents federal taxes (Figure 12). A detailed description of local, state, and federal taxes is provided in Table 20 in Appendix C.

Virginia

Overview

[13] Bureau of Labor Statistics, 2010: www.bls.gov.

[14] According to 2009 Bureau of Economic Analysis data, the Gross Regional Product of DC was $283.8 billion (source: www.bea.gov).

Virginia and Maryland have similar green economies in terms of size and industry mix. As expected, the total economic impact of green activities in Virginia is similar to that in Maryland and larger than in DC. Similar to Maryland, the spillover effects in Virginia are small because its larger geographic area and intra-state industrial trading patterns. Only 3 percent of the total state employment and 4 percent of the total state GRP can be attributed to spillover from DC and Maryland.

A summary of the cumulative economic impact of green activity on employment, labor income, GRP, economic output, and state/local and federal taxes is presented in Table 8 (below). Further detail on the direct, indirect, and induced effects of green activity in Virginia can be found in Appendix C (Table 22).

Table 8. Summary of Green Activity Impacts in Virginia

Description	Total Impact (Direct, Indirect, Induced)	
	2010	2012
Employment (jobs)	198,700	219,400
Labor Income (million $ 2010)	$9,970	$10,845
GRP, Value added (million $ 2010)	$14,890	$16,200
Economic Activity (million $ 2010)	$26,640	$28,770
Tax Revenues (million 2010$)		
State/Local Tax	$1,270	$1,410
Federal Tax	$2,020	$2,200

The 2010 cumulative impact of green activity on employment in Virginia was 198,700. We estimate that it will increase by about 10.4 percent to 219,000 in 2012. Similarly, labor income, GRP, and economic output are also expected to increase by an average rate of 9 percent from 2010 to 2012. The indirect and induced impacts of green activity in Virginia are larger than in DC and slightly larger than in Maryland. GRP and economic output differences follow a similar pattern.

The five industrial sectors that gain the most from green activity in Virginia are as follows:

- Construction
- Architectural, engineering and related services
- Private elementary and secondary schools
- Wholesale trade businesses, and
- Food services and drinking places.

The top ten industrial sectors in 2010 and 2012 affected by green activity and their corresponding economic impacts on employment, labor income, GRP, and economic output are presented in Appendix C (Table 24).

Employment

The direct, indirect, and induced impacts of green activity on employment in Virginia are provided in Figure 8 (above) and also in Table 22 in Appendix C. The number of jobs created by the combined indirect and induced impacts represents about 44 percent of the total jobs contributed by green activity. Virginia has an employment multiplier of 1.77 (slightly lower, but consistent with the multipliers for Maryland and the MARC region as a whole). There were 112,000 direct green jobs in Virginia (from the survey data) compared to total employment of 2,866,000 in 2010.[15] Direct green jobs represent roughly 3.9 percent of total employment in the Commonwealth; however, when the total number of jobs related to green activity is accounted for those 199,000 jobs, representing 6.9 percent of the total labor force in Virginia.

Labor Income

Figure 9 (above) illustrates the direct, indirect, and induced effect of green activity on labor income. Consistent with the number of jobs in Virginia, the labor income also increases significantly due to green activity in the state. Direct labor income represents about 57 percent of total labor income, while the remaining 43 percent comes from indirect and induced impacts of labor income. The percentage of direct labor income in Virginia is similar to that of Maryland but lower than that of DC.

Gross Regional Product (Value Added)

The direct, indirect, and induced effects of green activity on GRP in Maryland are shown in Figure 10 (above). The GRP multiplier in Virginia is 1.94 (comparable to that of the MARC region). The $14.9 billion of GRP generated in 2010 due to green activity contributed about 3.7 percent to the total GRP for Virginia[16].

Economic Output

The direct, indirect, and induced effects of green activity on economic output in Virginia are illustrated in Figure 11 (above). The ratio of direct, indirect, and induced effects and the multiplier is comparable to the GRP findings.

Tax Impacts

Of the $3.3 billion in tax revenue generated in 2010 in Virginia, roughly 39 percent represents state/local taxes, and the remaining 61 percent represents federal taxes (Figure 12 - above). The detailed description of local, state, and federal taxes is provided on Table 23 (see Appendix C).

Workforce Investment Area

Overview

As it can be seen in the maps below (Figure 13- Figure 22), the impact of green activity is more likely to be concentrated in cities and urban areas compared to rural counties. This finding is

[15] U.S. Bureau of Labor Statistics, 2010: www.bls.gov

[16] Based on Bureau of Economic Analysis 2009 data, the GDP of Virginia was $406.3 billion: www.bls.gov

not surprising because (direct) green activity is very likely to be concentrated in urban areas. The total impact is further concentrated in these areas as major suppliers and retail outlets tend to be located in urban areas.

The detailed model results for direct, indirect, and induced effect of green activity and their corresponding types of local, state, and federal taxes for each WIA area in Maryland and Virginia are provided in Appendix C.

Employment

Figure 13. Green-Activity Impact on Employment by WIA Level, 2010

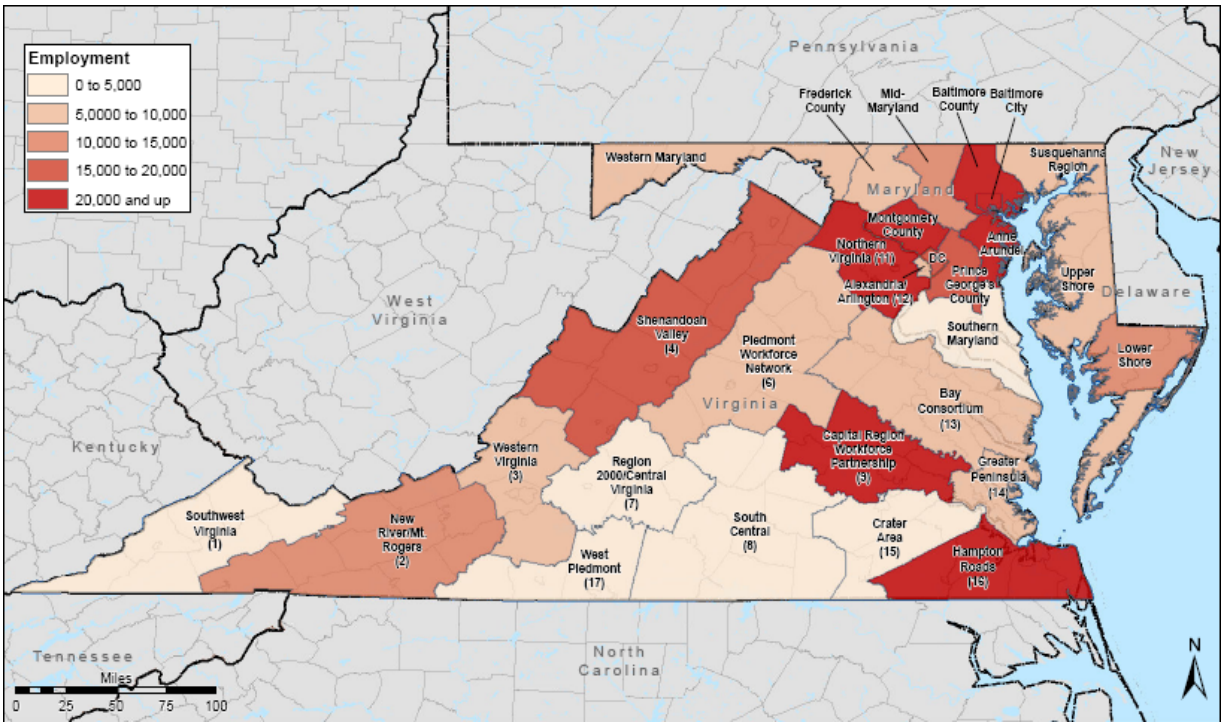
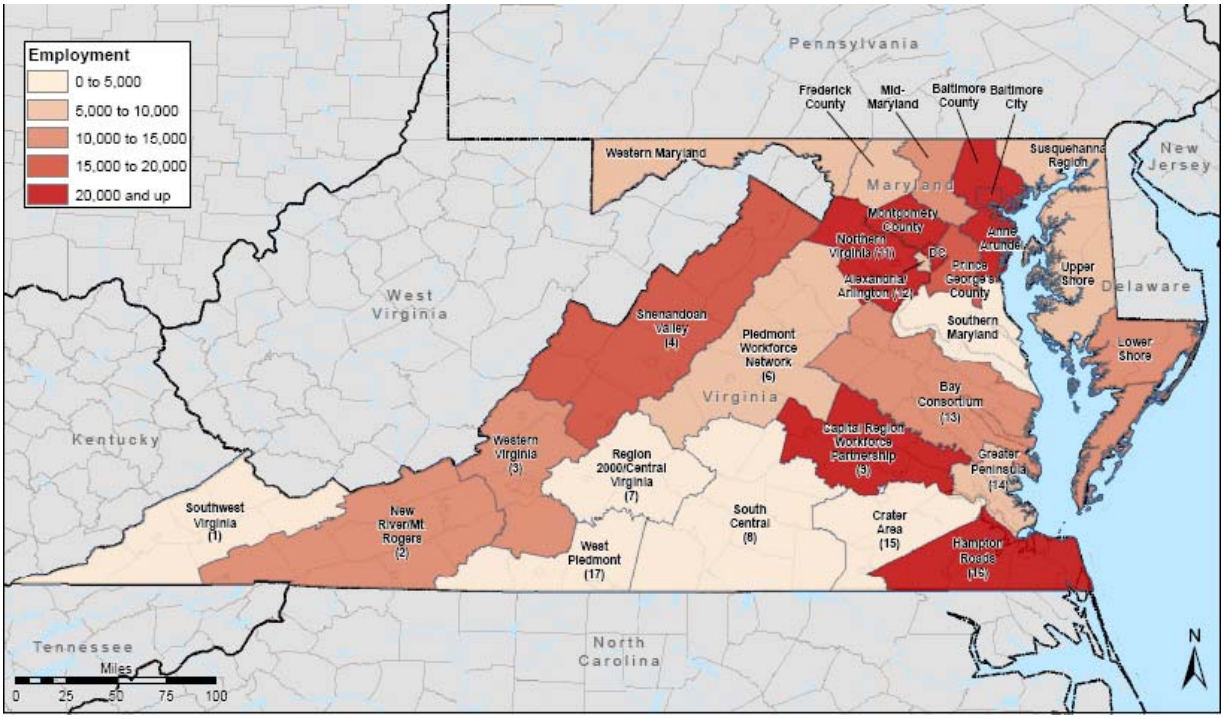


Figure 14. Green-Activity Impact on Employment by WIA Level, 2012



Labor Income

Figure 15. Green-Activity Impact on Labor Income by WIA Level, 2010

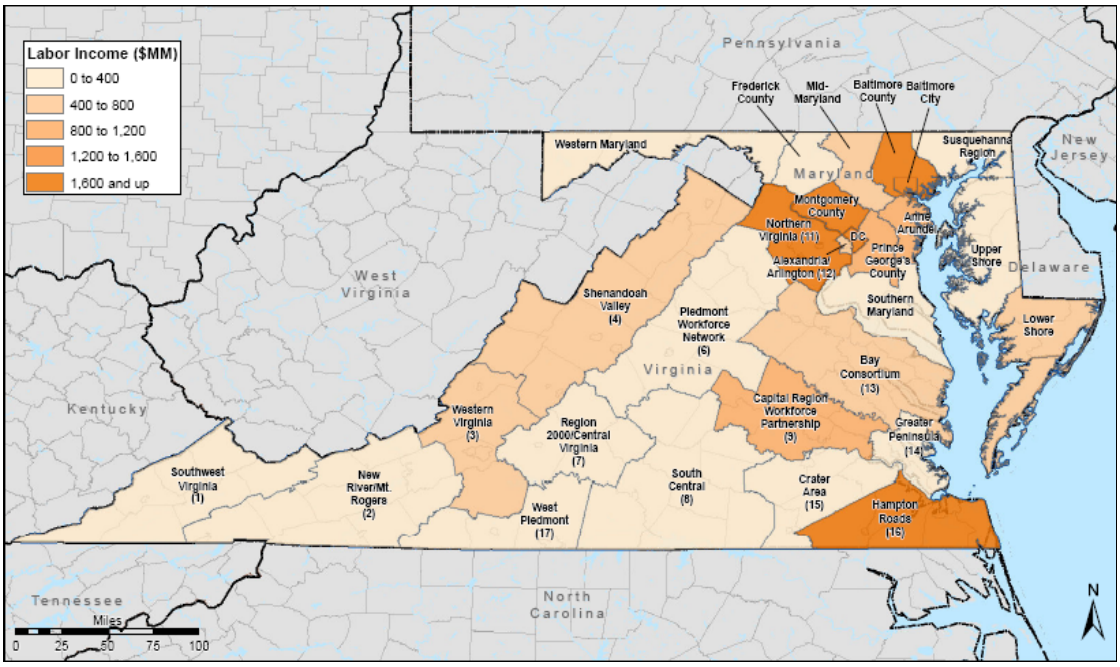
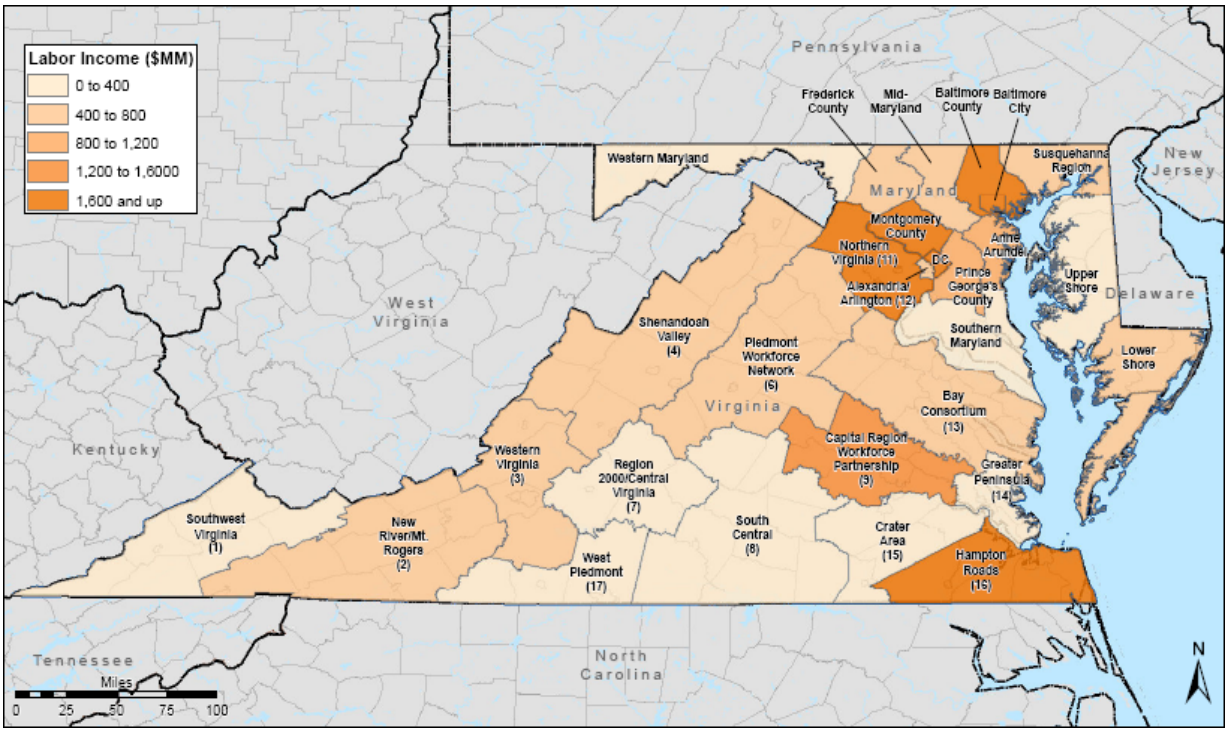


Figure 16. Green-Activity Impact on Labor Income by WIA Level, 2012



Gross Regional Product (Value Added)

Figure 17. Green-Activity Impact on GRP by WIA Level, 2010

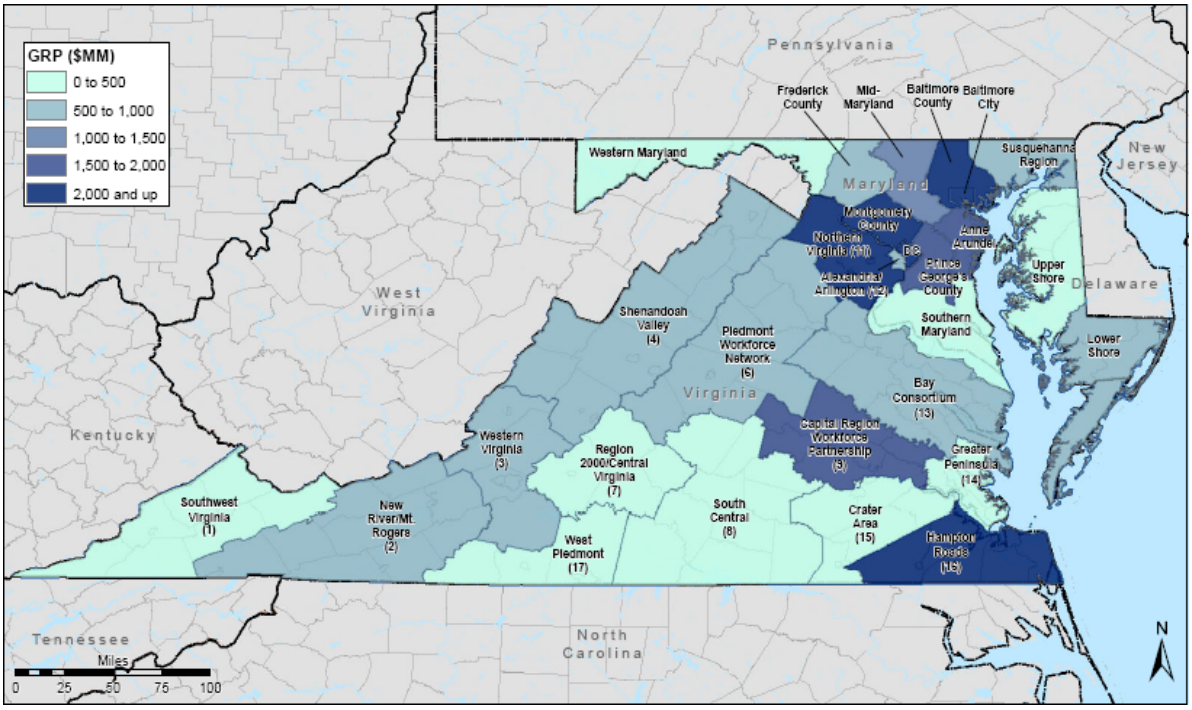
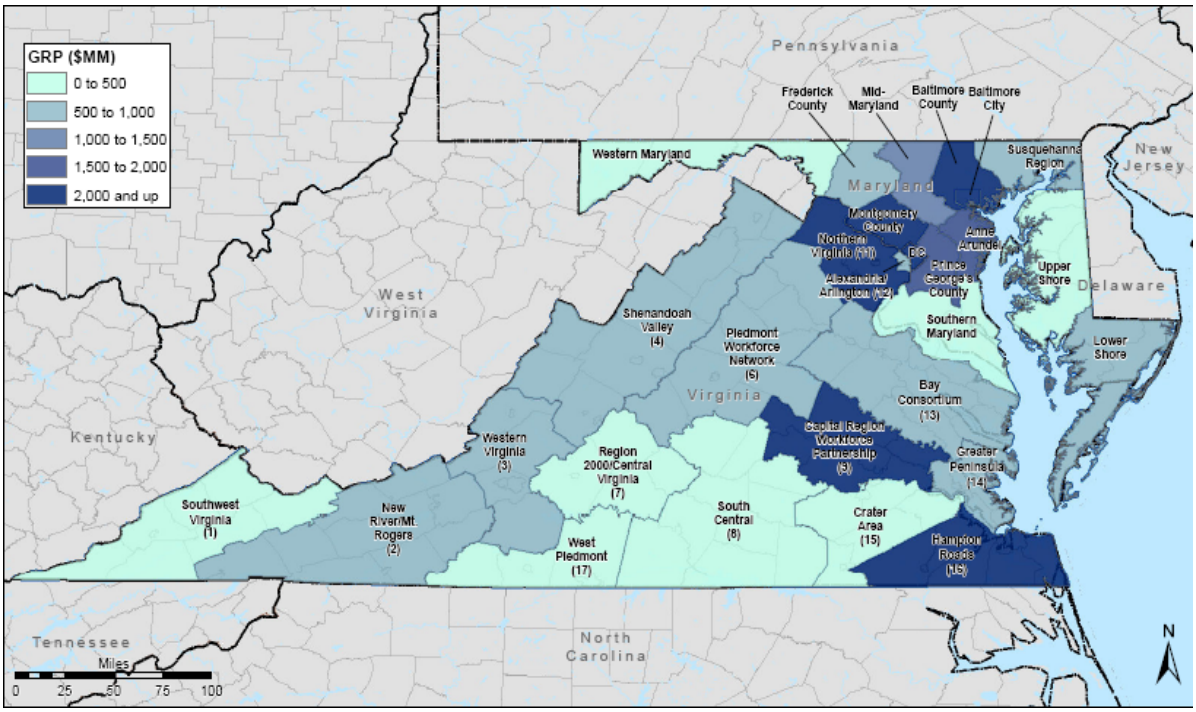


Figure 18. Green-Activity Impact on GRP by WIA Level, 2012



Economic Output

Figure 19. Green-Activity Impact on Economic output by WIA Level, 2010

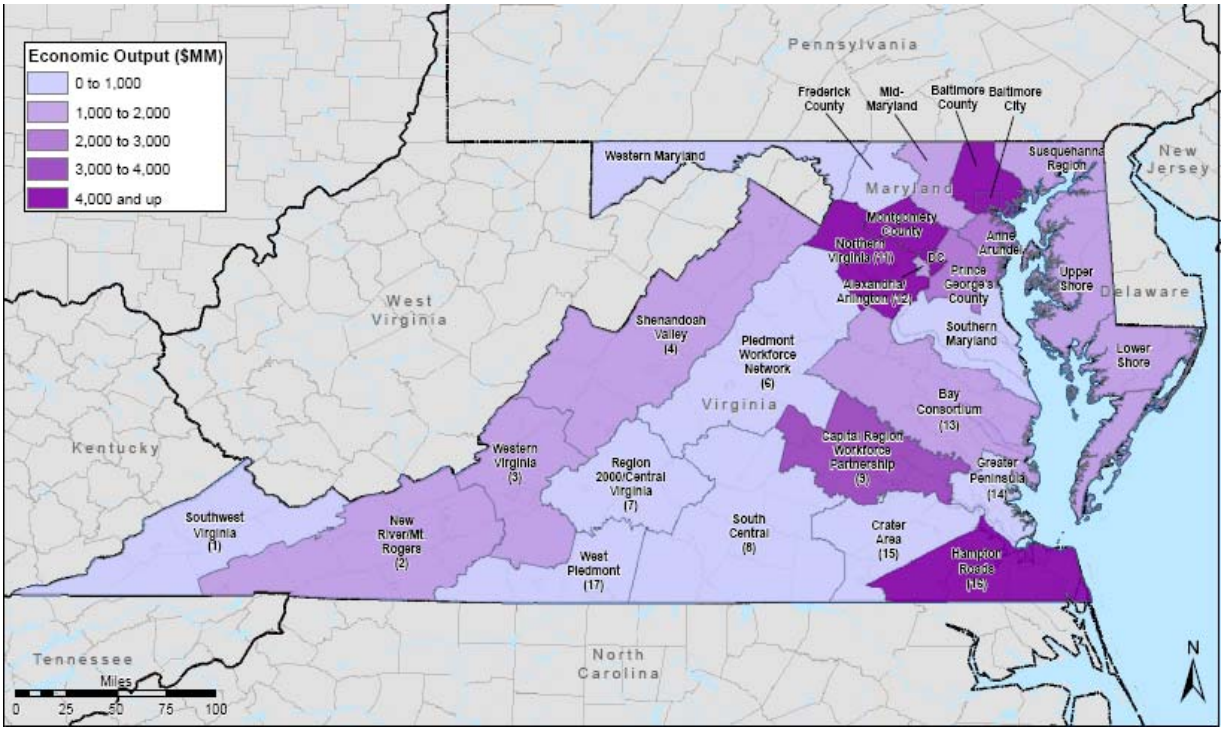
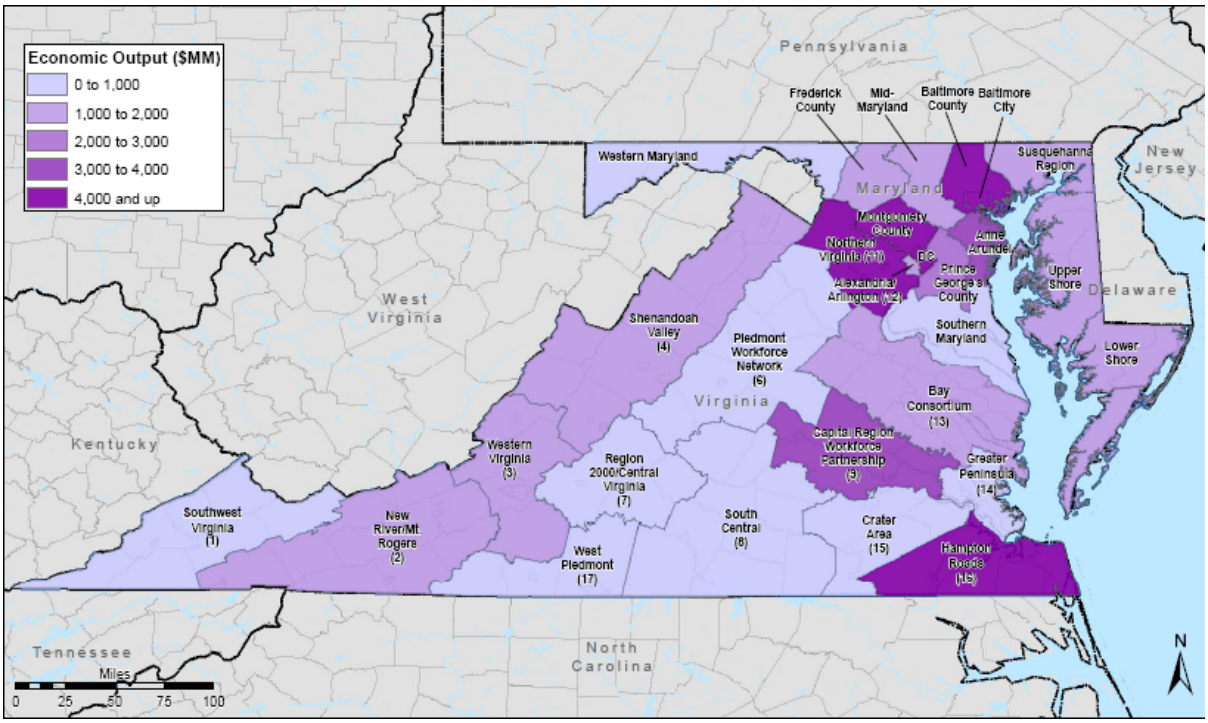


Figure 20. Green-Activity Impact on Economic output by WIA Level, 2012



Tax Impacts

Figure 21. Green-Activity Impact on Tax Revenues by WIA Level, 2010

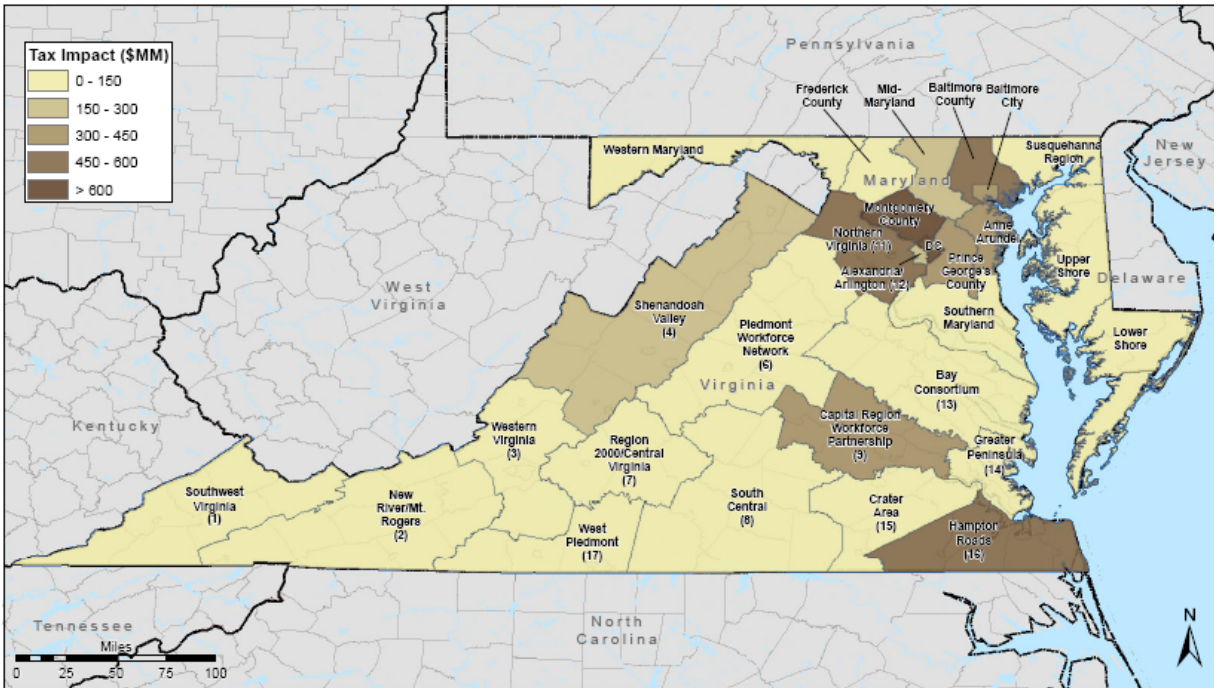
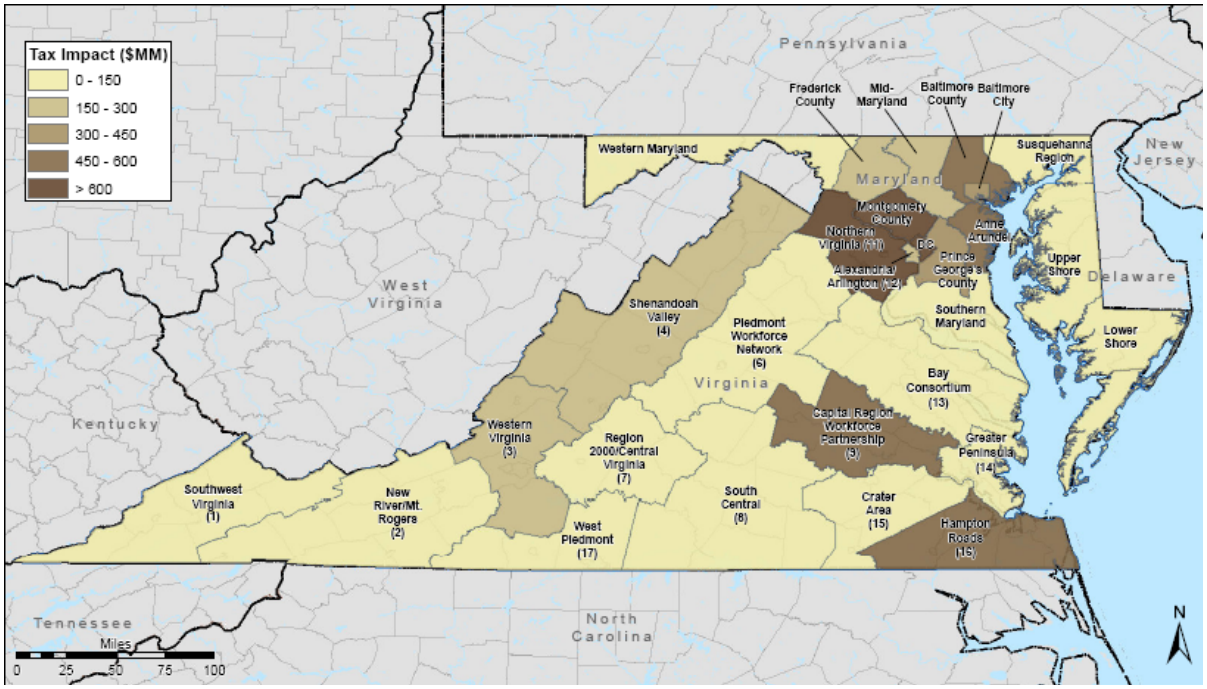


Figure 22. Green-Activity Impact on Tax Revenues by WIA Level, 2012



4.4. Customized Model Results

In addition to conducting the base impact analysis for the current (2010) and projected (2012) green activity in the MARC region, ICF also performed a separate analysis that took into account the fact that green and traditional jobs differ and, therefore, their economic impacts are expected to differ as well.

Currently, there is a lack of industry-level, quantitative data that compares green jobs to traditional industry jobs. However, several studies provide evidence of higher income for green jobs, particularly in renewable energy and energy efficiency. This evidence suggests that there is a wage premium for green labor, especially in industries that are more technical in nature and require higher levels of education and training.

We used this evidence to conduct sensitivity analysis on the assumption that green jobs pay a 10 percent wage premium. Since the evidence suggests that this wage premium is not universal across all industries, we limited our customization to the 25 industry sectors with the most relative green activity. Our analysis, presented below, compares the results of this customized analysis to the base model for 2010.

MARC Region

As can be seen in Table 9, when one accounts for the higher compensation for green jobs, there is an additional 6,500 jobs and $4 million tax revenue in the MARC region.

Table 9. Comparison between Base and Customized Models
MARC Region, 2010

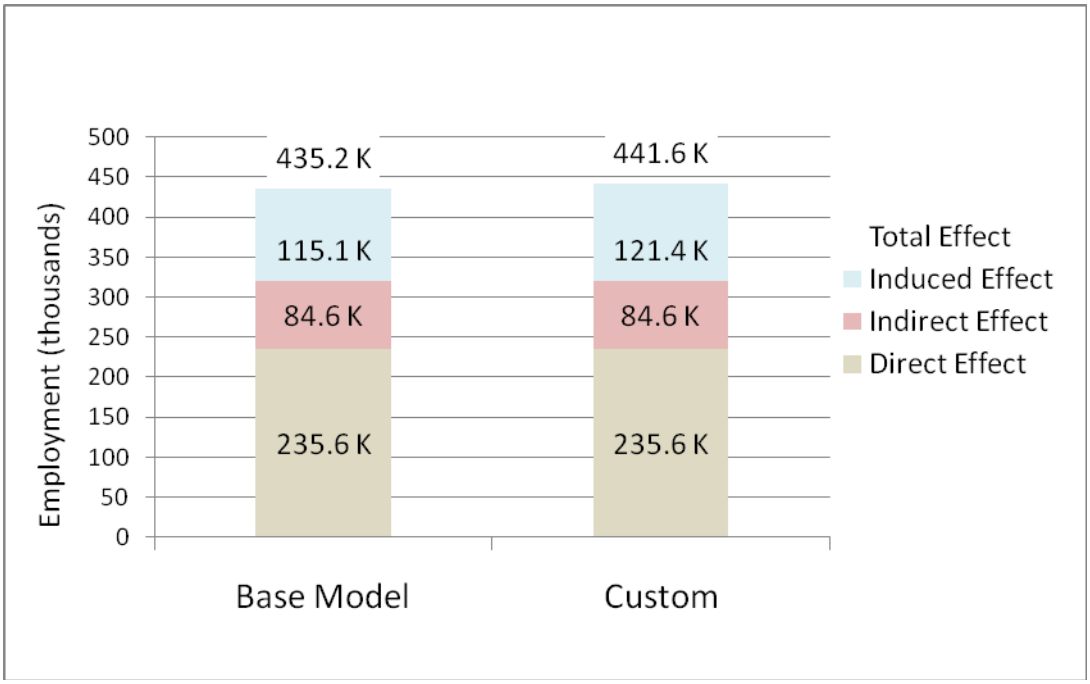
Description	Cumulative Total Impact (Direct, Indirect, Induced)		
	Base	Custom	Difference
Employment ('000 jobs)	435.2	441.6	6.4
Labor Income (billion 2010$)	$23.3	$24.6	$1.3
GRP, Value added (billion 2010$)	$34.8	$36.4	$1.6
Economic Output (billion 2010$)	$62.1	$63.0	$0.9
Tax Revenues (billion 2010$)			
State/Local Tax	$3.6	$3.7	$0.1
Federal Tax	$4.6	$4.8	$0.2

Employment

As Figure 23 illustrates, there is no substantial difference in direct and indirect impacts on employment between the base and customized results. The direct impact does not change because the number of direct green jobs in both scenarios is the same. The indirect impact on employment also remains the same because the demand of goods and services from primary

industries does not change if the number of direct jobs remains constant. However, the induced impact on employment increases in the customized model by 5.5 percent. This is due to the higher labor income for green jobs, which leads to additional consumer spending in the region.

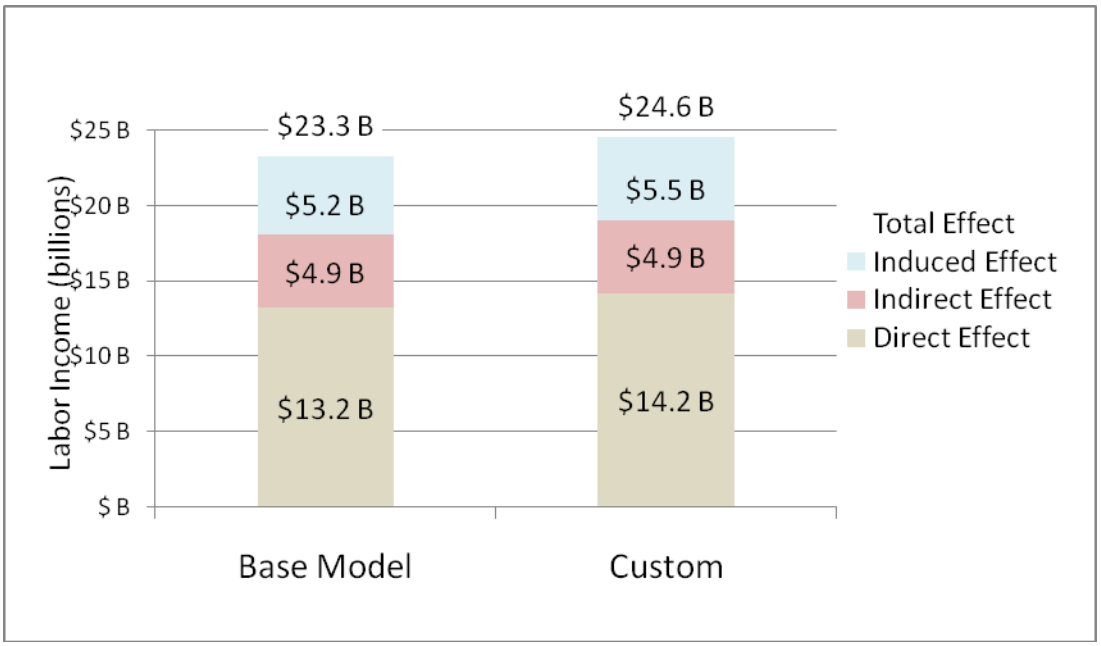
Figure 23. Customized Green Activity Impacts on Employment MARC Region, 2010



Labor Income

The direct effect on labor income is higher in the customized model compared to the base model because of the underlining assumption of the model (10 percent wage premium for green labor). The indirect effect remains the same, however, because the demand for goods and services does not change as the primary industries' outputs do not change. However, the induced labor income increases as a result of higher household income and expenditures (see Figure 24, below).

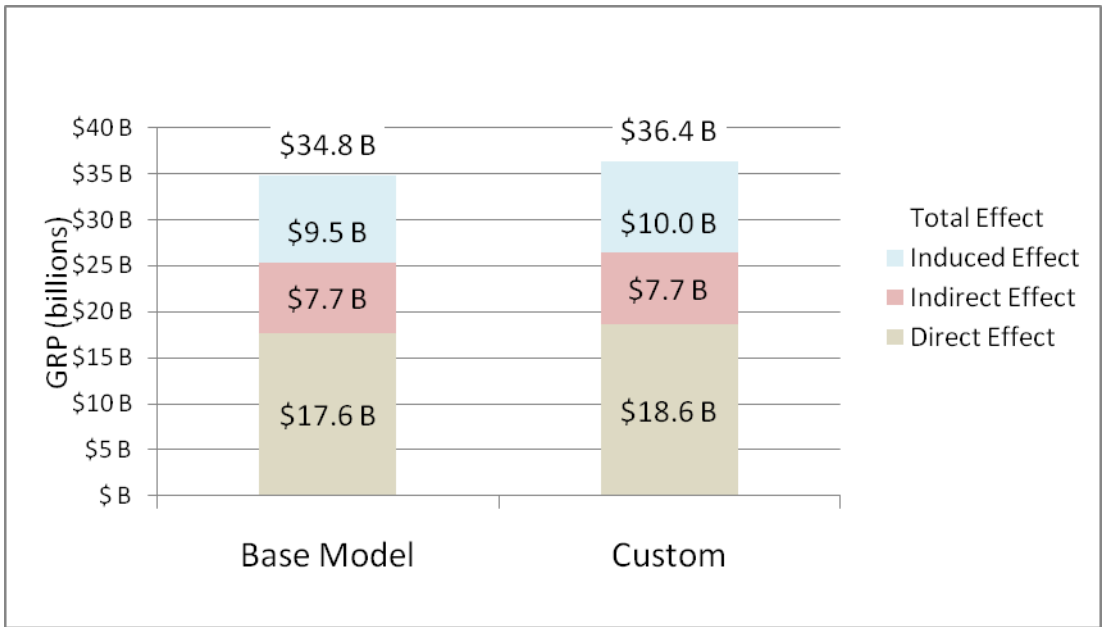
Figure 24. Customized Green Activity Impacts on Labor Income
MARC Region, 2010



Gross Regional Product (Value Added)

The impact of higher income for green jobs on GRP is illustrated in Figure 25 below. Both the direct and induced effects increase; however, the indirect effect remains the same. In this scenario, there is an additional $1.6 billion in GRP in the MARC region.

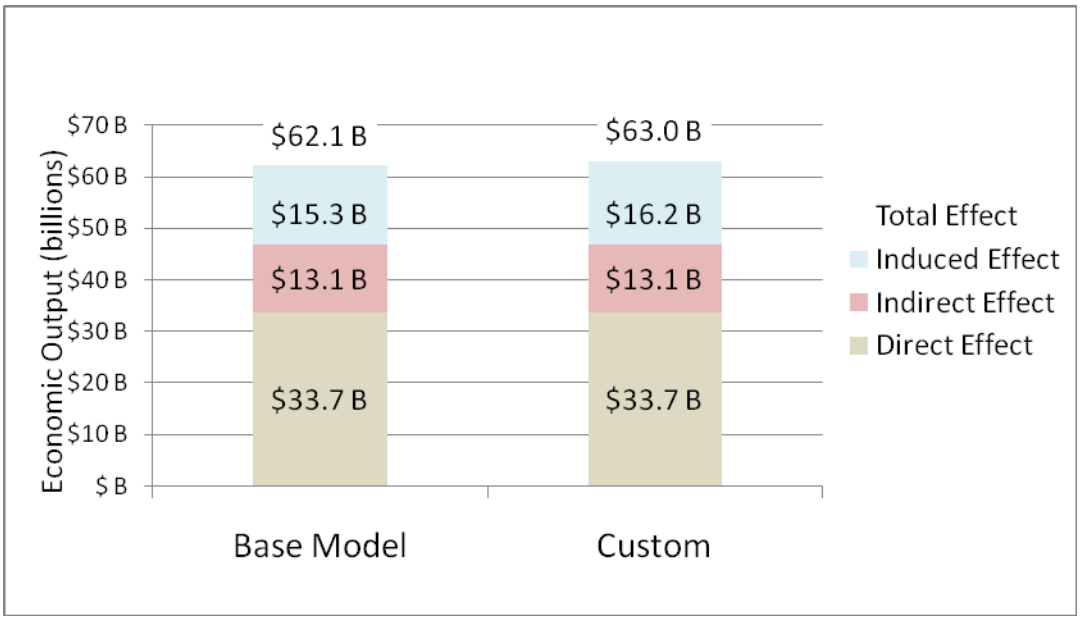
Figure 25. Customized Green Activity Impacts on GRP MARC Region, 2010



Economic Output

The customized results indicate that overall economic output will also increase by $0.9 billion due to increased earnings from green workers. As it can be seen in Figure 26 below, only the induced effect increases, while the direct and indirect effects remain relatively constant.

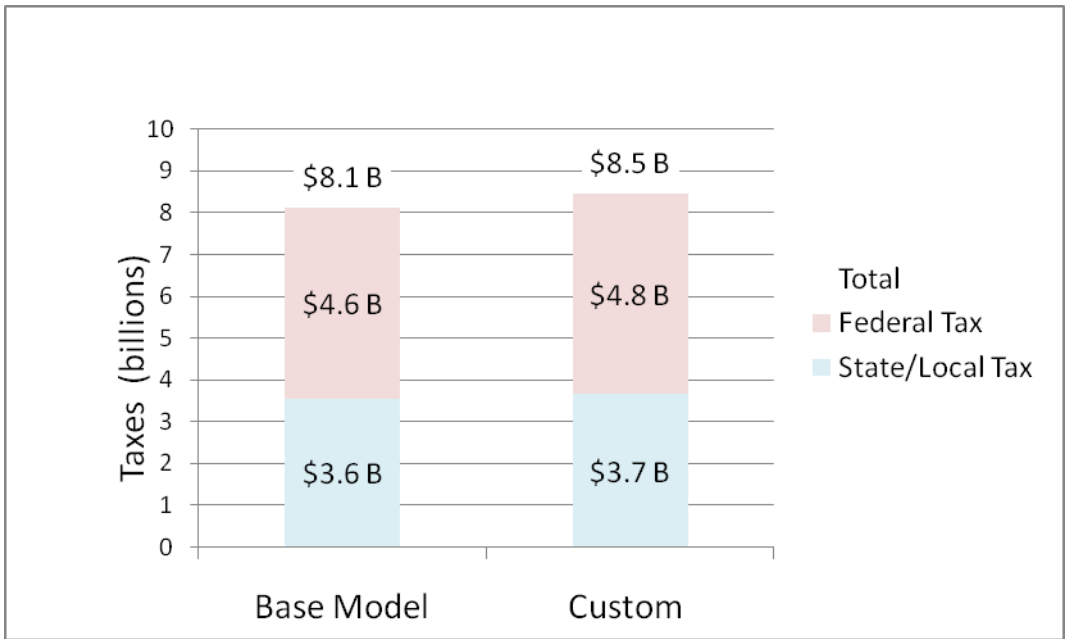
Figure 26. Customized Green Activity Impacts on Economic Output MARC Region, 2010



Tax Impacts

Finally, assuming that green jobs pay a 10 percent wage premium, green activity in the MARC region will bring an additional $400 million in tax revenues for the region. The impact increases proportionally between state/local and federal sources, as shown in Figure 27.

Figure 27. Customized Green Activity Impacts on Taxes in MARC Region, 2010



5. Conclusion

While the entire region receives positive economic returns from green activity, green multipliers (indirect and induced impacts) differ across geographic areas based on the composition of the green sectors. The DC economy is dominated by high labor-value-added sectors, such as professional services. These sectors have lower multipliers than construction and industrial sectors because the main input to professional services is labor.

In comparison, the Maryland and Virginia green economies are composed of industry sectors that are more likely to need inputs other than labor. These industries have higher multipliers and, therefore, the impact of green activity in these states is higher than in DC. In DC, 5 percent of the labor force is employed in industries that are supported by green activity compared to 10 percent in Maryland and 7 percent in Virginia. Green activity contributes 3 percent to DC's total GDP, compared to 6 percent in Maryland and 4 percent in Virginia.

Analysis at the WIA level indicates that in both Maryland and Virginia urban areas gain more from green activity than rural areas. This is caused not only by the fact that cities are more likely to have direct green activity, but they are also more likely to benefit from the indirect and induced effects.

The number of green jobs is expected to grow significantly in the region. Thus, it is not surprising that the impact of green jobs will also grow. Across the MARC region, the two-year growth in employment associated with green activities is expected at 9 percent, with a high in the DC Metro area at 14 percent and a low in DC at 7 percent).

To model the uniqueness of the green economy, we customized the model by increasing by 10 percent the labor income for green jobs in select industries. According to our sensitivity analysis, green activity generates an additional 6,500 jobs and $4 million in tax revenue in the MARC region beyond what we captured in our base model (which assumed no wage premium for green jobs over traditional jobs). However, this assumption of higher income for green jobs deserves further research. There is lack of quantitative data that specifically compares the income level of green jobs to traditional jobs for each green sector. Further analysis should be conducted to test our assumptions when industry-specific wage information for green sectors becomes available.

Appendix A: Detailed Modeling Methodology

Overview of the IMPLAN Model

The IMPLAN model is a proprietary, static input-output framework used to analyze the effects of an economic stimulus on a pre-specified economic region (in this case, the MARC region, each jurisdiction/state and collection of counties that comprise each WIA in Maryland, Virginia and DC). IMPLAN is considered static because the impacts calculated for any scenario by the model are estimates of the indirect and induced impacts for one time period (in this case, one year).

The modeling framework in IMPLAN consists of two components: the descriptive model and the predictive model. The descriptive model defines the local economy in the specified modeling region, and includes accounting tables that trace the "flow of dollars from purchasers to producers within the region."[17] It also includes the trade flows that describe the movement of goods and services, both inside and outside the modeling region (i.e., regional exports and imports with the outside region).

In addition, IMPLAN includes the Social Accounting Matrices (SAM) that traces the flow of money between institutions, such as transfer payments from governments to businesses and households, and taxes paid by households and businesses to governments.

The predictive model consists of a set of "local-level multipliers" that can be used to analyze the changes in final demand and their ripple effects throughout the local economy. IMPLAN Version 3.0 uses 2008 data and improves on previous versions of the model by implementing a new method for estimating regional imports and exports. This new method of estimating imports looks at annual trade flow information between economic regions, thereby allowing more sophisticated estimation of imports and exports than the traditional econometric estimate used by Version 2. Additionally, this new modeling method allows for multi-regional modeling functions, in which IMPLAN tracks imports and exports between selected models allowing the users to assess how the impact in one region can impact additional regional economies.

The IMPLAN model is based on the input-output data from the U.S. National Income and Product Accounts (NIPA) from the Bureau of Economic Analysis. The model includes 440 industry sectors based on the North American Industry Classification System (NAICS). (See Appendix B for the IMPLAN industry sector – NAICS code crosswalk table.) The model uses region-specific multipliers to trace and calculate the flow of dollars from the industries that originate the impact to supplier industries. These multipliers are coefficients that "describe the response of the economy to a stimulus (a change in demand or production)."[18]

[17] IMPLAN Pro User Guide.

[18] Ibid.

It should also be noted that IMPLAN does not distinguish between full-time and part-time employment. Therefore, impacts presented in this report equate to the actual number of "bodies" employed, rather than the amount of full-time employment activity generated. For simplicity, in this report we sometimes use the term "jobs" to denote "annual jobs."

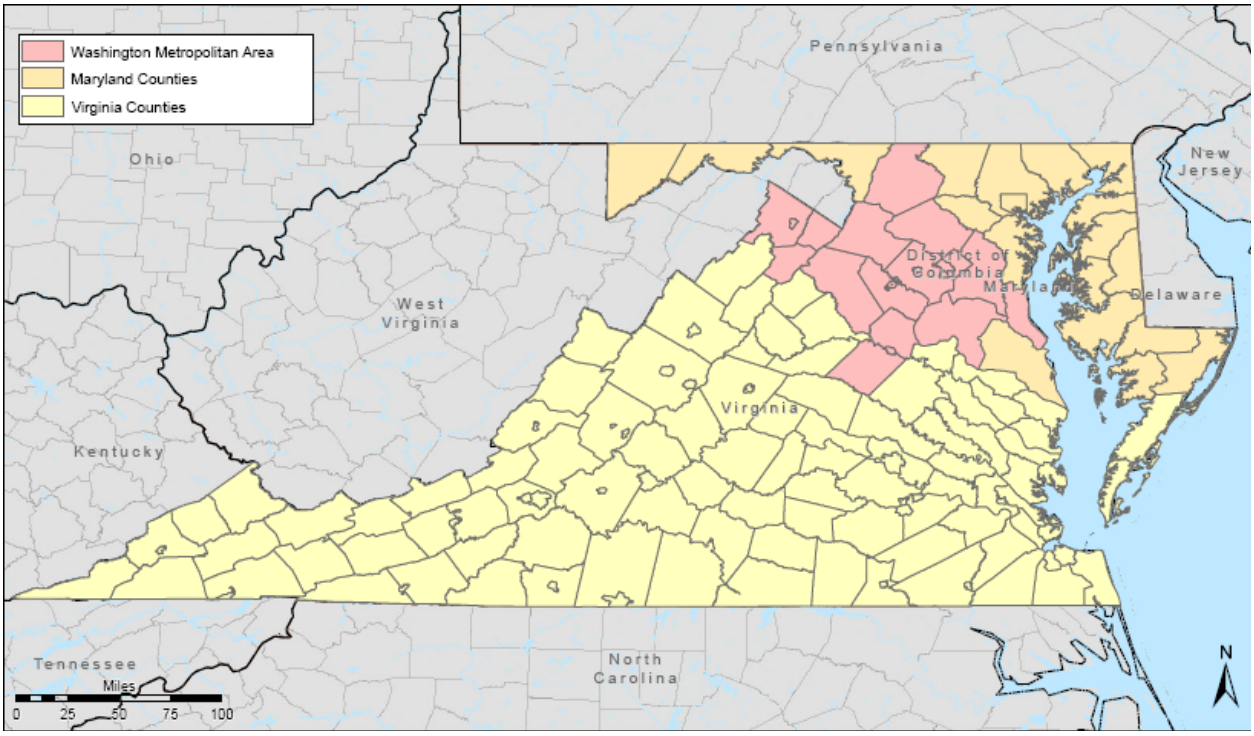
Additional Detail on Preparing the Data and Modeling Framework

The ICF team used data gathered by the MARC Regional Employer Survey in DC, Maryland, and Virginia. We used the current (2010) and projected (2012) green jobs employment data as the main inputs for the IMPLAN model. However the data required some up-front manipulation before it could be input into the model, including the following two steps:

- **Creating Custom Modeling Regions**: Before the data can be input any customized regions need to be created. For this project, several custom regions needed to be created. First, the MARC region was created by aggregating the state files for Maryland, Virginia and the District of Columbia. The DC Metro Area custom region was created by aggregating the relevant counties from Maryland, Virginia and the District of Columbia (see Figure 28). And lastly, each WIA needed to be created by aggregating the relevant county files.

- **Creating Input Templates**: The green employment data derived from the survey was organized by industry sector using the North American Industry Classification System (NAICS); however the IMPLAN model has its own classification system. Using the crosswalk (See Appendix B), we created an input template for each modeling region (MARC region, each jurisdiction/state and each county in Maryland and Virginia) that included information on the number of green jobs by IMPLAN assigned industry. As can be seen from the crosswalk, IMPLAN industry codes generally align well with NAICS industry codes. The one primary exception is the construction sector, which is broken down into specific NAICS codes that do not align with IMPLAN codes. Due to this misalignment, we aggregated all construction employment and created a super-sector, "All Construction" in the model.

Figure 28. Map for Washington Metropolitan Area



The Washington Metropolitan Area includes:

- District of Columbia
- Counties in Maryland: Calvert, Charles, Frederick, Montgomery, and Prince George
- Counties in Virginia: Arlington, Clarke, Fairfax, Fauquier, Frederick, Loudoun, Prince William, Spotsylvania, Stafford and Warren
- Cities in Virginia: Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, and Manassas Park

Appendix B: IMPLAN Code – NAICS Code Crosswalk

IMPLAN Sector	IMPLAN Sector2	IMPLAN Sector3
1	Oilseed farming	11111-2
2	Grain farming	11113-6, 11119
3	Vegetable and melon farming	1112
4	Fruit farming	11131-2,111331-4, 111336*, 111339
5	Tree nut farming	111335, 111336*
6	Greenhouse, nursery, and floriculture production	1114
7	Tobacco farming	11191
8	Cotton farming	11192
9	Sugarcane and sugar beet farming	11193, 111991
10	All other crop farming	11194, 111992, 111998
11	Cattle ranching and farming	11211, 11213
12	Dairy cattle and milk production	11212
13	Poultry and egg production	1123
14	Animal production, except cattle and poultry and eggs	1122, 1124-5, 1129
15	Forest nurseries, forest products, and timber tracts	1131-2
16	Logging	1133
17	Fishing	1141
18	Hunting and trapping	1142
19	Support activities for agriculture and forestry	115
20	Oil and gas extraction	211
21	Coal mining	2121
22	Iron ore mining	21221
23	Copper, nickel, lead, and zinc mining	21223
24	Gold, silver, and other metal ore mining	21222, 21229
25	Stone mining and quarrying	21231
26	Sand, gravel, clay, and ceramic and refractory minerals mining and quarrying	21232
27	Other nonmetallic mineral mining and quarrying	21239
28	Drilling oil and gas wells	213111
29	Support activities for oil and gas operations	213112
30	Support activities for other mining	213113-5
31	Electric power generation, transmission, and distribution	2211
32	Natural gas distribution	2212
33	Water, sewage and other systems	2213
34	Construction of new nonresidential commercial and health care structures	23*
35	Construction of new nonresidential manufacturing structures	23*
36	Construction of other new nonresidential structures	23*
37	Construction of new residential permanent site single- and multi-family structures	23*
38	Construction of other new residential structures	23*
39	Maintenance and repair construction of nonresidential maintenance and repair	23*
40	Maintenance and repair construction of residential structures	23*
41	Dog and cat food manufacturing	311111
42	Other animal food manufacturing	311119
43	Flour milling and malt manufacturing	31121
44	Wet corn milling	311221
45	Soybean and other oilseed processing	311222-3
46	Fats and oils refining and blending	311225
47	Breakfast cereal manufacturing	311230
48	Sugar cane mills and refining	311311-2
49	Beet sugar manufacturing	311313
50	Chocolate and confectionery manufacturing from cacao beans	31132
51	Confectionery manufacturing from purchased chocolate	31133

52	Nonchocolate confectionery manufacturing	31134
53	Frozen food manufacturing	31141
54	Fruit and vegetable canning, pickling, and drying	31142
55	Fluid milk and butter manufacturing	311511-2
56	Cheese manufacturing	311513
57	Dry, condensed, and evaporated dairy product manufacturing	311514
58	Ice cream and frozen dessert manufacturing	311520
59	Animal (except poultry) slaughtering, rendering, and processing	311611-3
60	Poultry processing	311615
61	Seafood product preparation and packaging	3117
62	Bread and bakery product manufacturing	31181
63	Cookie, cracker, and pasta manufacturing	31182
64	Tortilla manufacturing	31183
65	Snack food manufacturing	31191
66	Coffee and tea manufacturing	31192
67	Flavoring syrup and concentrate manufacturing	31193
68	Seasoning and dressing manufacturing	31194
69	All other food manufacturing	31199
70	Soft drink and ice manufacturing	31211
71	Breweries	31212
72	Wineries	31213
73	Distilleries	31214
74	Tobacco product manufacturing	3122
75	Fiber, yarn, and thread mills	3131
76	Broadwoven fabric mills	31321
77	Narrow fabric mills and schiffli machine embroidery	31322
78	Nonwoven fabric mills	31323
79	Knit fabric mills	31324
80	Textile and fabric finishing mills	31331
81	Fabric coating mills	31332
82	Carpet and rug mills	31411
83	Curtain and linen mills	31412
84	Textile bag and canvas mills	31491
85	All other textile product mills	31499
86	Apparel knitting mills	31511, 31519
87	Cut and sew apparel contractors	31521
88	Men's and boys' cut and sew apparel manufacturing	31522
89	Women's and girls' cut and sew apparel manufacturing	31523
90	Other cut and sew apparel manufacturing	31529
91	Apparel accessories and other apparel manufacturing	3159
92	Leather and hide tanning and finishing	3161
93	Footwear manufacturing	3162
94	Other leather and allied product manufacturing	3169
95	Sawmills and wood preservation	3211
96	Veneer and plywood manufacturing	321211-2
97	Engineered wood member and truss manufacturing	321213-4
98	Reconstituted wood product manufacturing	321219
99	Wood windows and doors and millwork	32191
100	Wood container and pallet manufacturing	32192
101	Manufactured home (mobile home) manufacturing	321991
102	Prefabricated wood building manufacturing	321992
103	All other miscellaneous wood product manufacturing	321999
104	Pulp mills	32211
105	Paper mills	32212
106	Paperboard Mills	32213
107	Paperboard container manufacturing	32221
108	Coated and laminated paper, packaging paper and plastics film manufacturing	322221-2

109	All other paper bag and coated and treated paper manufacturing	322223-6
110	Stationery product manufacturing	32223
111	Sanitary paper product manufacturing	322291
112	All other converted paper product manufacturing	322299
113	Printing	32311
114	Support activities for printing	32312
115	Petroleum refineries	32411
116	Asphalt paving mixture and block manufacturing	324121
117	Asphalt shingle and coating materials manufacturing	324122
118	Petroleum lubricating oil and grease manufacturing	324191
119	All other petroleum and coal products manufacturing	324199
120	Petrochemical manufacturing	32511
121	Industrial gas manufacturing	32512
122	Synthetic dye and pigment manufacturing	32513
123	Alkalies and chlorine manufacturing	325181
124	Carbon black manufacturing	325182
125	All other basic inorganic chemical manufacturing	325188
126	Other basic organic chemical manufacturing	32519
127	Plastics material and resin manufacturing	325211
128	Synthetic rubber manufacturing	325212
129	Artificial and synthetic fibers and filaments manufacturing	32522
130	Fertilizer manufacturing	325311-4
131	Pesticide and other agricultural chemical manufacturing	325320
132	Medicinal and botanical manufacturing	325411
133	Pharmaceutical preparation manufacturing	325412
134	In-vitro diagnostic substance manufacturing	325413
135	Biological product (except diagnostic) manufacturing	325414
136	Paint and coating manufacturing	32551
137	Adhesive manufacturing	32552
138	Soap and cleaning compound manufacturing	32561
139	Toilet preparation manufacturing	32562
140	Printing ink manufacturing	32591
141	All other chemical product and preparation manufacturing	32592, 32599
142	Plastics packaging materials and unlaminated film and sheet manufacturing	32611
143	Unlaminated plastics profile shape manufacturing	326121
144	Plastics pipe and pipe fitting manufacturing	326122
145	Laminated plastics plate, sheet (except packaging), and shape manufacturing	32613
146	Polystyrene foam product manufacturing	32614
147	Urethane and other foam product (except polystyrene) manufacturing	32615
148	Plastics bottle manufacturing	32616
149	Other plastics product manufacturing	32619
150	Tire manufacturing	32621
151	Rubber and plastics hoses and belting manufacturing	32622
152	Other rubber product manufacturing	32629
153	Pottery, ceramics, and plumbing fixture manufacturing	32711
154	Brick, tile, and other structural clay product manufacturing	327121-3
155	Clay and nonclay refractory manufacturing	327124-5
156	Flat glass manufacturing	327211
157	Other pressed and blown glass and glassware manufacturing	327212
158	Glass container manufacturing	327213
159	Glass product manufacturing made of purchased glass	327215
160	Cement manufacturing	32731
161	Ready-mix concrete manufacturing	32732
162	Concrete pipe, brick, and block manufacturing	32733
163	Other concrete product manufacturing	32739
164	Lime and gypsum product manufacturing	3274

165	Abrasive product manufacturing	32791
166	Cut stone and stone product manufacturing	327991
167	Ground or treated mineral and earth manufacturing	327992
168	Mineral wool manufacturing	327993
169	Miscellaneous nonmetallic mineral products	327999
170	Iron and steel mills and ferroalloy manufacturing	3311
171	Steel product manufacturing from purchased steel	33121, 33122
172	Alumina refining and primary aluminum production	331311-2
173	Secondary smelting and alloying of aluminum	331314
174	Aluminum product manufacturing from purchased aluminum	331315, 331316, 331319
175	Primary smelting and refining of copper	331411
176	Primary smelting and refining of nonferrous metal (except copper and aluminum)	331419
177	Copper rolling, drawing, extruding and alloying	33142
178	Nonferrous metal (except copper and aluminum) rolling, drawing, extruding and alloying	33149
179	Ferrous metal foundries	33151
180	Nonferrous metal foundries	33152
181	All other forging, stamping, and sintering	332111-2, 332117
182	Custom roll forming	332114
183	Crown and closure manufacturing and metal stamping	332115-6
184	Cutlery, utensil, pot, and pan manufacturing	332211, 332214
185	Handtool manufacturing	332212-3
186	Plate work and fabricated structural product manufacturing	33231
187	Ornamental and architectural metal products manufacturing	33232
188	Power boiler and heat exchanger manufacturing	33241
189	Metal tank (heavy gauge) manufacturing	33242
190	Metal can, box, and other metal container (light gauge) manufacturing	33243
191	Ammunition manufacturing	332992-3
192	Arms, ordnance, and accessories manufacturing	332994-5
193	Hardware manufacturing	3325
194	Spring and wire product manufacturing	3326
195	Machine shops	33271
196	Turned product and screw, nut, and bolt manufacturing	33272
197	Coating, engraving, heat treating and allied activities	3328
198	Valve and fittings other than plumbing	332911-2, 332919
199	Plumbing fixture fitting and trim manufacturing	332913
200	Ball and roller bearing manufacturing	332991
201	Fabricated pipe and pipe fitting manufacturing	332996
202	Other fabricated metal manufacturing	332997-9
203	Farm machinery and equipment manufacturing	333111
204	Lawn and garden equipment manufacturing	333112
205	Construction machinery manufacturing	33312
206	Mining and oil and gas field machinery manufacturing	33313
207	Other industrial machinery manufacturing	33321, 333291-4, 333298
208	Plastics and rubber industry machinery manufacturing	33322
209	Semiconductor machinery manufacturing	333295
210	Vending, commercial, industrial, and office machinery manufacturing	333311-3
211	Optical instrument and lens manufacturing	333314
212	Photographic and photocopying equipment manufacturing	333315
213	Other commercial and service industry machinery manufacturing	333319
214	Air purification and ventilation equipment manufacturing	333411-2
215	Heating equipment (except warm air furnaces) manufacturing	333414
216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	333415
217	Industrial mold manufacturing	333511
218	Metal cutting and forming machine tool manufacturing	333512-3
219	Special tool, die, jig, and fixture manufacturing	333514
220	Cutting tool and machine tool accessory manufacturing	333515

221	Rolling mill and other metalworking machinery manufacturing	333516, 333518
222	Turbine and turbine generator set units manufacturing	333611
223	Speed changer, industrial high-speed drive, and gear manufacturing	333612
224	Mechanical power transmission equipment manufacturing	333613
225	Other engine equipment manufacturing	333618
226	Pump and pumping equipment manufacturing	333911, 333913
227	Air and gas compressor manufacturing	333912
228	Material handling equipment manufacturing	333921-4
229	Power-driven handtool manufacturing	333991
230	Other general purpose machinery manufacturing	333992, 333997, 333999
231	Packaging machinery manufacturing	333993
232	Industrial process furnace and oven manufacturing	333994
233	Fluid power process machinery	333995-6
234	Electronic computer manufacturing	334111
235	Computer storage device manufacturing	334112
236	Computer terminals and other computer peripheral equipment manufacturing	334113, 334119
237	Telephone apparatus manufacturing	33421
238	Broadcast and wireless communications equipment	33422
239	Other communications equipment manufacturing	33429
240	Audio and video equipment manufacturing	3343
241	Electron tube manufacturing	334411
242	Bare printed circuit board manufacturing	334412
243	Semiconductor and related device manufacturing	334413
244	Electronic capacitor, resistor, coil, transformer, and other inductor manufacturing	334414-6
245	Electronic connector manufacturing	334417
246	Printed circuit assembly (electronic assembly) manufacturing	334418
247	Other electronic component manufacturing	334419
248	Electromedical and electrotherapeutic apparatus manufacturing	334510
249	Search, detection, and navigation instruments manufacturing	334511
250	Automatic environmental control manufacturing	334512
251	Industrial process variable instruments manufacturing	334513
252	Totalizing fluid meters and counting devices manufacturing	334514
253	Electricity and signal testing instruments manufacturing	334515
254	Analytical laboratory instrument manufacturing	334516
255	Irradiation apparatus manufacturing	334517
256	Watch, clock, and other measuring and controlling device manufacturing	334518-9
257	Software, audio, and video media reproducing	334611-2
258	Magnetic and optical recording media manufacturing	334613
259	Electric lamp bulb and part manufacturing	33511
260	Lighting fixture manufacturing	33512
261	Small electrical appliance manufacturing	33521
262	Household cooking appliance manufacturing	335221
263	Household refrigerator and home freezer manufacturing	335222
264	Household laundry equipment manufacturing	335224
265	Other major household appliance manufacturing	335228
266	Power, distribution, and specialty transformer manufacturing	335311
267	Motor and generator manufacturing	335312
268	Switchgear and switchboard apparatus manufacturing	335313
269	Relay and industrial control manufacturing	335314
270	Storage battery manufacturing	335911
271	Primary battery manufacturing	335912
272	Communication and energy wire and cable manufacturing	33592
273	Wiring device manufacturing	33593
274	Carbon and graphite product manufacturing	335991
275	All other miscellaneous electrical equipment and component manufacturing	335999
276	Automobile manufacturing	336111
277	Light truck and utility vehicle manufacturing	336112

278	Heavy duty truck manufacturing	336120
279	Motor vehicle body manufacturing	336211
280	Truck trailer manufacturing	336212
281	Motor home manufacturing	336213
282	Travel trailer and camper manufacturing	336214
283	Motor vehicle parts manufacturing	3363
284	Aircraft manufacturing	336411
285	Aircraft engine and engine parts manufacturing	336412
286	Other aircraft parts and auxiliary equipment manufacturing	336413
287	Guided missile and space vehicle manufacturing	336414
288	Propulsion units and parts for space vehicles and guided missiles	336415, 336419
289	Railroad rolling stock manufacturing	3365
290	Ship building and repairing	336611
291	Boat building	336612
292	Motorcycle, bicycle, and parts manufacturing	336991
293	Military armored vehicle, tank, and tank component manufacturing	336992
294	All other transportation equipment manufacturing	336999
295	Wood kitchen cabinet and countertop manufacturing	33711
296	Upholstered household furniture manufacturing	337121
297	Nonupholstered wood household furniture manufacturing	337122
298	Metal and other household furniture (except wood) manufacturing[1]	337124-5
299	Institutional furniture manufacturing	337127
300	Wood television, radio, and sewing machine cabinet manufacturing[1]	337129
301	Office furniture and custom architectural woodwork and millwork manufacturing[1]	337211, 337212, 337214
302	Showcase, partition, shelving, and locker manufacturing	337215
303	Mattress manufacturing	33791
304	Blind and shade manufacturing	33792
305	Surgical and medical instrument manufacturing	339112
306	Surgical appliance and supplies manufacturing	339113
307	Dental equipment and supplies manufacturing	339114
308	Ophthalmic goods manufacturing	339115
309	Dental laboratories	339116
310	Jewelry and silverware manufacturing	33991
311	Sporting and athletic goods manufacturing	33992
312	Doll, toy, and game manufacturing	33993
313	Office supplies (except paper) manufacturing	33994
314	Sign manufacturing	33995
315	Gasket, packing, and sealing device manufacturing	339991
316	Musical instrument manufacturing	339992
317	All other miscellaneous manufacturing	339993, 339995, 339999
318	Broom, brush, and mop manufacturing	339994
319	Wholesale trade	42
320	Retail - Motor vehicle and parts	441
321	Retail - Furniture and home furnishings	442
322	Retail - Electronics and appliances	443
323	Retail - Building material and garden supply	444
324	Retail - Food and beverage	445
325	Retail - Health and personal care	446
326	Retail - Gasoline stations	447
327	Retail - Clothing and clothing accessories	448
328	Retail - Sporting goods, hobby, book and music	451
329	Retail - General merchandise	452
330	Retail - Miscellaneous	453
331	Retail - Nonstore	454
332	Air transportation	481
333	Rail transportation	482
334	Water transportation	483

335	Truck transportation	484
336	Transit and ground passenger transportation	485
337	Pipeline transportation	486
338	Scenic and sightseeing transportation and support activities for transportation	487, 488
339	Couriers and messengers	492
340	Warehousing and storage	493
341	Newspaper publishers	51111
342	Periodical publishers	51112
343	Book publishers	51113
344	Directory, mailing list, and other publishers	51114, 51119
345	Software publishers	51121
346	Motion picture and video industries	5121
347	Sound recording industries	5122
348	Radio and television broadcasting	5151
349	Cable and other subscription programming	5152
350	Internet publishing and broadcasting	51913
351	Telecommunications	517
352	Data processing, hosting, and related services	518
353	Other information services	51911-2
354	Monetary authorities and depository credit intermediation	521, 5221
355	Nondepository credit intermediation and related activities	5222-3
356	Securities, commodity contracts, investments, and related activities	523
357	Insurance carriers	5241
358	Insurance agencies, brokerages, and related activities	5242
359	Funds, trusts, and other financial vehicles	525
360	Real estate	531
361	Imputed rental value for owner-occupied dwellings	n.a.
362	Automotive equipment rental and leasing	5321
363	General and consumer goods rental except video tapes and discs	53221-2, 53229, 5323
364	Video tape and disc rental	53223
365	Commercial and industrial machinery and equipment rental and leasing	5324
366	Lessors of nonfinancial intangible assets	533
367	Legal services	5411
368	Accounting, tax preparation, bookkeeping, and payroll services	5412
369	Architectural, engineering, and related services	5413
370	Specialized design services	5414
371	Custom computer programming services	541511
372	Computer systems design services	541512
373	Other computer related services, including facilities management	541513, 541519
374	Management, scientific, and technical consulting services	54161, 5613*
375	Environmental and other technical consulting services	54162, 54169
376	Scientific research and development services	5417
377	Advertising and related services	5418
378	Photographic services	54192
379	Veterinary services	54194
380	All other miscellaneous professional, scientific, and technical services	54191, 54193, 54199
381	Management of companies and enterprises	55
382	Employment services	5613*
383	Travel arrangement and reservation services	5615
384	Office administrative services	5611
385	Facilities support services	5612
386	Business support services	5614
387	Investigation and security services	5616
388	Services to buildings and dwellings	5617
389	Other support services	5619
390	Waste management and remediation services	562
391	Elementary and secondary schools	6111

392	Junior colleges, colleges, universities, and professional schools	6112-3
393	Other educational services	6114-7
394	Offices of physicians, dentists, and other health practitioners	6211-3
395	Home health care services	6216
396	Medical and diagnostic labs and outpatient and other ambulatory care services	6214-5, 6219
397	Hospitals	622
398	Nursing and residential care facilities	623
399	Child day care services	6244
400	Individual and family services	6241
401	Community food, housing, and other relief services, including rehabilitation services	6242-3
402	Performing arts companies	7111
403	Spectator sports	7112
404	Promoters of performing arts and sports and agents for public figures	7113-4
405	Independent artists, writers, and performers	7115
406	Museums, historical sites, zoos, and parks	712
407	Fitness and recreational sports centers	71394
408	Bowling centers	71395
409	Amusement parks, arcades, and gambling industries	7131-2
410	Other amusement and recreation industries	71391-3, 71399
411	Hotels and motels, including casino hotels	72111-2
412	Other accommodations	72119, 7212-3
413	Food services and drinking places	722
414	Automotive repair and maintenance, except car washes	81111-2, 811191, 811198
415	Car washes	811192
416	Electronic and precision equipment repair and maintenance	8112
417	Commercial and industrial machinery and equipment repair and maintenance	8113
418	Personal and household goods repair and maintenance	8114
419	Personal care services	8121
420	Death care services	8122
421	Dry-cleaning and laundry services	8123
422	Other personal services	8129
423	Religious organizations	8131
424	Grantmaking, giving, and social advocacy organizations	8132, 8133
425	Civic, social, professional, and similar organizations	8134, 8139
426	Private households	814
427	Postal service	491
428	Federal electric utilities	n.a.
429	Other Federal Government enterprises	n.a.
430	State and local government passenger transit	n.a.
431	State and local government electric utilities	n.a.
432	Other state and local government enterprises	n.a.
433	*Not an industry (Used and secondhand goods)	n.a.
434	*Not an industry (Scrap)	n.a.
435	*Not an industry (Rest of the world adjustment)	n.a.
436	*Not an industry (Noncomparable imports)	n.a.
437	Employment and payroll for SL Government Non-Education	n.a.
438	Employment and payroll for SL Government Education	n.a.
439	Employment and payroll for Federal Non-Military	n.a.
440	Employment and payroll for Federal Military	n.a.

Appendix C: Detailed Results by Region

MARC Region

Table 10. Total Economic Impact of Green Jobs in MARC Region

(billion 2010$)

Impact Type	Employment (in '000)	Labor Income	Value Added (GRP)	Economic Output
Current Green Jobs (2010)				
Direct Effect	235.6	$13.2	$17.6	$33.7
Indirect Effect	84.6	$4.9	$7.7	$13.1
Induced Effect	115.1	$5.2	$9.5	$15.3
Total:	435.3	$23.3	$34.8	$62.1
Projected Green Jobs (2012)				
Direct Effect	263.6	$14.0	$18.8	$35.5
Indirect Effect	89.1	$5.1	$8.2	$13.8
Induced Effect	122.1	$5.5	$10.0	$16.3
Total:	474.7	$24.7	$37.0	$65.7

Table 11. State/Local and Federal Tax Impacts in MARC Region

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$63	$0	$2,089	$881	$522
Federal Tax	$2,268	$111	$214	$1,594	$375
Projected Green Jobs (2012)					
State and Local Tax	$67	$0	$2,275	$934	$551
Federal Tax	$2,405	$118	$233	$1,690	$395

Table 12. Most Impacted Top 10 Industrial Sectors by Employment in MARC Region

(million 2010$)

Sector	Description	Employment (in '000)	Labor Income	GRP	Economic Output
	Impacts from Current Green Jobs in 2010				
34	Construction Super Sector	64.5	$3,261	$3,829	$8,147
369	Architectural, engineering, and related services	23.1	$1,975	$2,086	$3,309
319	Wholesale trade businesses	20.3	$1,670	$2,877	$4,209
389	Other support services	18.9	$606	$1,130	$1,789
413	Food services and drinking places	17.6	$412	$580	$1,085
391	Private elementary and secondary schools	13.8	$481	$479	$666
360	Real estate establishments	13.5	$237	$1,772	$2,387
432	Other state and local government enterprises	13.2	$886	$1,005	$3,470
425	Civic, social, professional, and similar organizations	9.9	$616	$621	$872
329	Retail Stores - General merchandise	7.5	$205	$333	$274
	Impacts from Projected Green Jobs in 2012				
34	Construction Super Sector	72.8	$3,392	$3,982	$8,472
369	Architectural, engineering, and related services	26.9	$2,192	$2,314	$3,671
389	Other support services	23.2	$700	$1,306	$2,067
319	Wholesale trade businesses	22.8	$1,909	$3,289	$4,812
413	Food services and drinking places	18.6	$436	$613	$1,147
360	Real estate establishments	14.3	$250	$1,869	$2,516
391	Private elementary and secondary schools	14.1	$463	$461	$641
432	Other state and local government enterprises	13.7	$871	$988	$3,413
425	Civic, social, professional, and similar organizations	10.9	$645	$650	$913
329	Retail Stores - General merchandise	7.8	$212	$345	$287

Washington Metropolitan Area

Table 13. Total Economic Impact of Green Jobs in DC Metro Area

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	77,800	$5,378	$7,279	$12,611
Indirect Effect	23,500	$1,543	$2,430	$3,909
Induced Effect	30,700	$1,535	$2,821	$4,445
Total:	132,000	$8,456	$12,529	$20,965
Projected Green Jobs (2012)				
Direct Effect	91,000	$5,939	$7,956	$13,686
Indirect Effect	25,600	$1,688	$2,651	$4,251
Induced Effect	33,800	$1,692	$3,109	$4,899
Total:	150,400	$9,319	$13,716	$22,835

Table 14. State/Local and Federal Tax Impacts in DC Metro Area

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$29	$0	$755	$364	$253
Federal Tax	$794	$33	$51	$651	$118
Projected Green Jobs (2012)					
State and Local Tax	$32	$0	$850	$402	$270
Federal Tax	$876	$36	$58	$718	$126

Table 15. Most Impacted Top 10 Industrial Sectors by Employment in DC Metro Area

(million 2010$)

Sector	Description	Employment	Labor Income	GRP	Economic Output
	Impacts from Current Green Jobs in 2010				
34	Construction Super Sector	19,200	$1,045	$1,226	$2,530
369	Architectural, engineering, and related services	9,600	$956	$1,009	$1,537
389	Other support services	6,800	$249	$465	$732
425	Civic, social, professional, and similar organizations	5,900	$542	$547	$702
413	Food services and drinking places	5,400	$149	$208	$371
360	Real estate establishments	3,800	$72	$539	$726
319	Wholesale trade businesses	3,800	$388	$668	$966
370	Specialized design services	3,400	$217	$353	$512
396	Medical and diagnostic labs and outpatient and other ambulatory care services	2,900	$199	$256	$447
414	Automotive repair and maintenance, except car washes	2,800	$135	$162	$244
	Impacts from Projected Green Jobs in 2012				
34	Construction Super Sector	23,800	$1,190	$1,397	$2,883
369	Architectural, engineering, and related services	12,200	$1,152	$1,216	$1,853
389	Other support services	7,600	$260	$485	$764
425	Civic, social, professional, and similar organizations	6,700	$574	$579	$744
413	Food services and drinking places	5,900	$162	$226	$403
319	Wholesale trade businesses	4,800	$500	$861	$1,244
360	Real estate establishments	4,200	$80	$600	$808
370	Specialized design services	3,500	$210	$341	$495
414	Automotive repair and maintenance, except car washes	3,400	$159	$191	$287
396	Medical and diagnostic labs and outpatient and other ambulatory care services	3,300	$215	$277	$483

District of Columbia

Table 16. Total Economic Impact of Green Jobs in District of Columbia

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	11,700	$1,359	$2,001	$3,133
Indirect Effect	4,600	$419	$663	$1,038
Induced Effect	3,700	$246	$419	$662
Total:	20,000	$2,024	$3,083	$4,833
Projected Green Jobs (2012)				
Direct Effect	12,900	$1,378	$2,020	$3,152
Indirect Effect	4,800	$435	$685	$1,071
Induced Effect	3,800	$253	$431	$681
Total:	21,400	$2,067	$3,136	$4,904

Table 17. State/Local and Federal Tax Impacts in District of Columbia

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$18	$0	$177	$98	$166
Federal Tax	$177	$8	$3	$75	$23
Projected Green Jobs (2012)					
State and Local Tax	$18	$0	$181	$101	$167
Federal Tax	$181	$8	$3	$77	$23

Table 18. Most Impacted Top 10 Industrial Sectors by Employment in District of Columbia

(million 2010$)

Sector	Description	Employment	Labor Income	GRP	Economic Output
	Impacts from Current Green Jobs in 2010				
425	Civic, social, professional, and similar organizations	2,900	$315	$318	$396
396	Medical and diagnostic labs and outpatient and other ambulatory care services	2,500	$196	$252	$423
369	Architectural, engineering, and related services	1,200	$140	$147	$217
392	Private junior colleges, colleges, universities, and professional schools	700	$36	$37	$64
377	Advertising and related services	700	$106	$161	$241
413	Food services and drinking places	700	$24	$32	$54
367	Legal services	600	$97	$172	$213
105	Paper mills	500	$212	$490	$855
376	Scientific research and development services	500	$49	$49	$84
374	Management, sc., and technical consulting services	500	$61	$69	$98
	Impacts from Projected Green Jobs in 2012				
425	Civic, social, professional, and similar organizations	3,100	$310	$313	$390
396	Medical and diagnostic labs and outpatient and other ambulatory care services	2,800	$211	$271	$454
369	Architectural, engineering, and related services	1,300	$141	$149	$220
392	Private junior colleges, colleges, universities, and professional schools	700	$36	$37	$64
377	Advertising and related services	700	$103	$156	$234
413	Food services and drinking places	700	$24	$33	$54
367	Legal services	600	$90	$160	$198
374	Management, sc. ,and technical consulting services	600	$70	$79	$113
105	Paper mills	500	$208	$481	$839
34	Construction Super Sector	500	$29	$32	$60

Maryland

Table 19. Total Economic Impact of Green Jobs in Maryland

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	111,600	$6,283	$8,373	$15,911
Indirect Effect	38,500	$2,148	$3,445	$5,890
Induced Effect	55,100	$2,452	$4,449	$7,146
Total:	205,300	$10,884	$16,267	$28,947
Projected Green Jobs (2012)				
Direct Effect	124,700	$6,551	$8,762	$16,494
Indirect Effect	40,000	$2,231	$3,575	$6,115
Induced Effect	57,100	$2,540	$4,608	$7,402
Total:	221,800	$11,322	$16,945	$30,012

Table 20. State/Local and Federal Tax Impacts in Maryland

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$15	$0	$866	$463	$133
Federal Tax	$1,141	$51	$155	$753	$177
Projected Green Jobs (2012)					
State and Local Tax	$15	$0	$917	$481	$138
Federal Tax	$1,186	$53	$165	$783	$184

Table 21. Most Impacted Top 10 Industrial Sectors by Employment in Maryland

(million 2010$)

Sector	Description	Employment	Labor Income	GRP	Economic Output
	Impacts from Current Green Jobs in 2010				
425	Civic, social, professional, and similar organizations	34,900	$1,957	$2,204	$4,245
396	Medical and diagnostic labs and outpatient and other ambulatory care services	12,200	$428	$798	$1,260
369	Architectural, engineering, and related services	8,900	$758	$1,306	$1,908
392	Private junior colleges, colleges, universities, and professional schools	8,700	$694	$733	$1,184
377	Advertising and related services	8,600	$575	$653	$2,251
413	Food services and drinking places	7,600	$181	$258	$478
367	Legal services	6,400	$103	$770	$1,036
105	Paper mills	4,400	$243	$422	$838
376	Scientific research and development services	4,300	$117	$190	$117
374	Management, sc., and technical consulting services	4,000	$194	$196	$296
	Impacts from Projected Green Jobs in 2012				
425	Civic, social, professional, and similar organizations	39,900	$2,060	$2,320	$4,469
396	Medical and diagnostic labs and outpatient and other ambulatory care services	15,500	$509	$948	$1,498
369	Architectural, engineering, and related services	9,300	$714	$754	$1,219
392	Private junior colleges, colleges, universities, and professional schools	9,200	$798	$1,376	$2,011
377	Advertising and related services	8,800	$559	$634	$2,187
413	Food services and drinking places	7,900	$188	$267	$495
367	Legal services	6,600	$106	$792	$1,067
374	Management, sc. ,and technical consulting services	4,500	$246	$427	$849
105	Paper mills	4,500	$209	$210	$318
425	Civic, social, professional, and similar organizations	34,900	$1,957	$2,204	$4,245

Virginia

Table 22. Total Economic Impact of Green Jobs in Virginia

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	112,300	$5,822	$7,667	$14,522
Indirect Effect	36,800	$2,057	$3,303	$5,758
Induced Effect	49,600	$2,091	$3,917	$6,355
Total:	198,700	$9,970	$14,887	$26,635
Projected Green Jobs (2012)				
Direct Effect	126,000	$6,362	$8,392	$15,704
Indirect Effect	39,500	$2,213	$3,549	$6,160
Induced Effect	53,900	$2,271	$4,255	$6,903
Total:	219,400	$10,846	$16,196	$28,767

Table 23. State/Local and Federal Tax Impacts in Virginia

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$19	$0	$876	$269	$103
Federal Tax	$965	$51	$162	$683	$157
Projected Green Jobs (2012)					
State and Local Tax	$20	$0	$987	$293	$111
Federal Tax	$1,051	$55	$182	$742	$170

Table 24. Most Impacted Top 10 Industrial Sectors by Employment in Virginia

(million 2010$)

Sector	Description	Employment (in '000)	Labor Income	GRP	Economic Output
	Impacts from Current Green Jobs in 2010				
425	Civic, social, professional, and similar organizations	26,900	$1,247	$1,405	$2,918
396	Medical and diagnostic labs and outpatient and other ambulatory care services	13,100	$1,123	$1,186	$1,880
369	Architectural, engineering, and related services	12,100	$350	$349	$510
392	Private junior colleges, colleges, universities, and professional schools	10,400	$821	$1,414	$2,073
377	Advertising and related services	7,500	$159	$226	$436
413	Food services and drinking places	6,600	$189	$352	$560
367	Legal services	6,000	$97	$730	$983
105	Paper mills	4,400	$284	$322	$1,138
376	Scientific research and development services	3,100	$144	$185	$410
374	Management, sc., and technical consulting services	3,000	$147	$148	$223
	Impacts from Projected Green Jobs in 2012				
425	Civic, social, professional, and similar organizations	30,000	$1,277	$1,439	$2,989
396	Medical and diagnostic labs and outpatient and other ambulatory care services	16,300	$1,316	$1,389	$2,202
369	Architectural, engineering, and related services	12,400	$1,005	$1,732	$2,538
392	Private junior colleges, colleges, universities, and professional schools	12,200	$330	$328	$480
377	Advertising and related services	8,200	$173	$245	$474
413	Food services and drinking places	7,700	$207	$386	$613
367	Legal services	6,500	$105	$791	$1,065
374	Management, sc. ,and technical consulting services	4,600	$285	$323	$1,142
105	Paper mills	3,400	$154	$198	$438
34	Construction Super Sector	3,300	$157	$159	$239

WIA Level: Maryland

(12 WIA level model runs)

Maryland WIA Anne Arundel

Table 25. Total Economic Impact of Green Jobs in Maryland WIA Anne Arundel

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	12,500	$616	$954	$1,595
Indirect Effect	3,700	$196	$312	$523
Induced Effect	4,800	$198	$371	$581
Total:	21,100	$1,011	$1,637	$2,699
Projected Green Jobs (2012)				
Direct Effect	15,600	$707	$1,124	$1,850
Indirect Effect	4,300	$223	$355	$591
Induced Effect	5,400	$222	$415	$649
Total:	25,300	$1,152	$1,894	$3,090

Table 26. State/Local and Federal Tax Impacts in Maryland WIA Anne Arundel

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$1.0		$114.2	$44.8	$14.9
Federal Tax	$98.7	$5.7	$20.4	$73.9	$19.8
Projected Green Jobs (2012)					
State and Local Tax	$1.1		$130.4	$51.0	$17.8
Federal Tax	$112.8	$6.3	$23.3	$84.2	$23.7

Maryland WIA Baltimore County

Table 27. Total Economic Impact of Green Jobs in Maryland WIA Baltimore County

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	17,100	$993	$1,198	$2,089
Indirect Effect	5,700	$296	$483	$826
Induced Effect	8,900	$379	$689	$1,094
Total:	31,600	$1,667	$2,371	$4,009
Projected Green Jobs (2012)				
Direct Effect	18,700	$1,016	$1,224	$2,135
Indirect Effect	5,700	$300	$490	$836
Induced Effect	9,100	$387	$704	$1,117
Total:	33,600	$1,703	$2,417	$4,088

Table 28. State/Local and Federal Tax Impacts in Maryland WIA Baltimore County

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$1.9		$129.3	$69.1	$16.7
Federal Tax	$178.7	$9.9	$25.1	$108.1	$22.3
Projected Green Jobs (2012)					
State and Local Tax	$1.9		$130.6	$70.6	$17.0
Federal Tax	$182.6	$10.2	$25.3	$110.4	$22.6

Maryland WIA Baltimore City

Table 29. Total Economic Impact of Green Jobs in Maryland WIA Baltimore City

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	16,900	$1,007	$1,278	$2,710
Indirect Effect	7,200	$422	$677	$1,147
Induced Effect	5,900	$301	$521	$837
Total:	30,100	$1,730	$2,476	$4,694
Projected Green Jobs (2012)				
Direct Effect	17,800	$999	$1,265	$2,668
Indirect Effect	7,200	$420	$675	$1,144
Induced Effect	5,900	$301	$521	$837
Total:	30,900	$1,720	$2,461	$4,649

Table 30. State/Local and Federal Tax Impacts in Maryland WIA Baltimore City

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$3.5		$60.0	$36.9	$20.4
Federal Tax	$189.3	$11.0	$14.0	$48.8	$27.2
Projected Green Jobs (2012)					
State and Local Tax	$3.5		$61.6	$36.6	$20.2
Federal Tax	$188.5	$10.7	$14.4	$48.4	$26.9

Maryland WIA Frederick County

Table 31. Total Economic Impact of Green Jobs in Maryland WIA Frederick County

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	3,500	$202	$321	$605
Indirect Effect	1,000	$60	$87	$145
Induced Effect	1,300	$53	$98	$158
Total:	5,900	$315	$506	$908
Projected Green Jobs (2012)				
Direct Effect	5,100	$280	$425	$768
Indirect Effect	1,300	$74	$107	$177
Induced Effect	1,800	$71	$131	$211
Total:	8,100	$425	$662	$1,156

Table 32. State/Local and Federal Tax Impacts in Maryland WIA Frederick County

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.4		$37.4	$13.6	$4.5
Federal Tax	$33.9	$1.5	$5.3	$21.9	$6.0
Projected Green Jobs (2012)					
State and Local Tax	$0.5		$49.1	$18.3	$5.5
Federal Tax	$45.8	$1.9	$7.0	$29.5	$7.3

Maryland WIA Lower Shore

Table 33. Total Economic Impact of Green Jobs in Maryland WIA Lower Shore

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	5,800	$260	$337	$782
Indirect Effect	2,300	$95	$159	$312
Induced Effect	2,400	$91	$165	$271
Total:	10,500	$446	$662	$1,365
Projected Green Jobs (2012)				
Direct Effect	6,000	$256	$337	$773
Indirect Effect	2,300	$95	$159	$315
Induced Effect	2,400	$90	$163	$268
Total:	10,700	$441	$659	$1,356

Table 34. State/Local and Federal Tax Impacts in Maryland WIA Lower Shore

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$1.0		$21.2	$15.4	$5.7
Federal Tax	$49.0	$4.7	$4.1	$21.5	$7.7
Projected Green Jobs (2012)					
State and Local Tax	$0.9		$22.7	$15.2	$5.7
Federal Tax	$48.3	$4.7	$4.4	$21.2	$7.6

Maryland WIA Mid-Maryland

Table 35. Total Economic Impact of Green Jobs in Maryland WIA Mid-Maryland

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	6,000	$348	$551	$1,122
Indirect Effect	3,000	$177	$297	$505
Induced Effect	2,400	$101	$198	$311
Total:	11,400	$627	$1,046	$1,939
Projected Green Jobs (2012)				
Direct Effect	6,000	$338	$538	$1,094
Indirect Effect	3,000	$177	$296	$503
Induced Effect	2,400	$100	$197	$309
Total:	11,300	$616	$1,031	$1,906

Table 36. State/Local and Federal Tax Impacts in Maryland WIA Mid-Maryland

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.8		$64.1	$28.0	$10.5
Federal Tax	$71.8	$1.8	$12.5	$48.0	$13.9
Projected Green Jobs (2012)					
State and Local Tax	$0.8		$64.8	$27.5	$10.3
Federal Tax	$70.6	$1.8	$12.7	$47.2	$13.7

Maryland WIA Montgomery County

Table 37. Total Economic Impact of Green Jobs in Maryland WIA Montgomery County

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	22,700	$1,267	$1,630	$2,650
Indirect Effect	5,100	$323	$504	$797
Induced Effect	6,300	$303	$575	$894
Total:	34,100	$1,893	$2,709	$4,342
Projected Green Jobs (2012)				
Direct Effect	26,100	$1,358	$1,727	$2,827
Indirect Effect	5,400	$343	$535	$846
Induced Effect	6,800	$324	$616	$958
Total:	38,300	$2,026	$2,878	$4,631

Table 38. State/Local and Federal Tax Impacts of in Maryland WIA Montgomery County

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$1.4		$151.7	$84.8	$15.3
Federal Tax	$182.2	$8.4	$28.8	$149.8	$20.3
Projected Green Jobs (2012)					
State and Local Tax	$1.5		$161.6	$90.7	$15.9
Federal Tax	$194.4	$9.1	$30.7	$160.3	$21.1

Maryland WIA Prince George's County

Table 39. Total Economic Impact of Green Jobs in Maryland WIA Prince George's County

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	10,600	$734	$953	$1,786
Indirect Effect	2,900	$160	$262	$427
Induced Effect	4,300	$181	$345	$542
Total:	17,800	$1,075	$1,560	$2,756
Projected Green Jobs (2012)				
Direct Effect	11,200	$732	$944	$1,763
Indirect Effect	2,800	$158	$259	$422
Induced Effect	4,300	$180	$344	$540
Total:	18,400	$1,070	$1,546	$2,725

Table 40. State/Local and Federal Tax Impacts in Maryland WIA Prince George's County

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$2.3		$64.6	$44.5	$12.5
Federal Tax	$117.9	$2.6	$10.2	$69.8	$16.6
Projected Green Jobs (2012)					
State and Local Tax	$2.3		$65.2	$44.3	$12.2
Federal Tax	$117.3	$2.7	$10.3	$69.5	$16.2

Maryland WIA Southern Maryland

Table 41. Total Economic Impact of Green Jobs in Maryland WIA Southern Maryland

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	2,700	$139	$201	$391
Indirect Effect	700	$35	$58	$104
Induced Effect	1,100	$40	$79	$124
Total:	4,500	$214	$337	$619
Projected Green Jobs (2012)				
Direct Effect	2,800	$137	$198	$385
Indirect Effect	700	$34	$57	$103
Induced Effect	1,100	$40	$78	$123
Total:	4,600	$211	$333	$610

Table 42. State/Local and Federal Tax Impacts in Maryland WIA Southern Maryland

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.3		$26.2	$9.4	$2.9
Federal Tax	$21.1	$1.7	$3.3	$15.0	$3.8
Projected Green Jobs (2012)					
State and Local Tax	$0.3		$26.2	$9.3	$2.8
Federal Tax	$20.7	$1.7	$3.3	$14.8	$3.7

Maryland WIA Susquehanna Region

Table 43. Total Economic Impact of Green Jobs in Maryland WIA Susquehanna Region

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	5,800	$274	$353	$861
Indirect Effect	1,400	$65	$100	$181
Induced Effect	1,700	$59	$112	$181
Total:	8,900	$399	$565	$1,223
Projected Green Jobs (2012)				
Direct Effect	6,700	$288	$377	$890
Indirect Effect	1,500	$67	$103	$186
Induced Effect	1,800	$62	$117	$189
Total:	9,900	$417	$597	$1,265

Table 44. State/Local and Federal Tax Impacts in Maryland WIA Susquehanna Region

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.5		$34.8	$16.8	$3.9
Federal Tax	$39.9	$2.5	$4.2	$26.1	$5.2
Projected Green Jobs (2012)					
State and Local Tax	$0.5		$37.2	$17.6	$4.2
Federal Tax	$41.7	$2.6	$4.5	$27.3	$5.6

Maryland WIA Upper Shore

Table 45. Total Economic Impact of Green Jobs in Maryland WIA Upper Shore

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	3,600	$163	$224	$624
Indirect Effect	1,700	$69	$113	$267
Induced Effect	1,500	$49	$90	$150
Total:	6,800	$281	$427	$1,041
Projected Green Jobs (2012)				
Direct Effect	3,900	$168	$236	$707
Indirect Effect	2,000	$79	$130	$319
Induced Effect	1,600	$52	$96	$160
Total:	7,400	$299	$462	$1,186

Table 46. State/Local and Federal Tax Impacts in Maryland WIA Upper Shore

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.4		$27.2	$11.2	$2.2
Federal Tax	$30.8	$2.9	$3.9	$16.8	$2.9
Projected Green Jobs (2012)					
State and Local Tax	$0.5		$30.2	$11.9	$2.4
Federal Tax	$32.9	$3.1	$4.3	$17.9	$3.2

Maryland WIA Western Maryland

Table 47. Total Economic Impact of Green Jobs in Maryland WIA Western Maryland

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	3,900	$178	$219	$456
Indirect Effect	800	$33	$52	$98
Induced Effect	1,500	$51	$89	$150
Total:	6,100	$262	$361	$705
Projected Green Jobs (2012)				
Direct Effect	4,100	$179	$221	$457
Indirect Effect	800	$34	$53	$100
Induced Effect	1,500	$51	$90	$152
Total:	6,400	$264	$364	$708

Table 48. State/Local and Federal Tax Impacts in Maryland WIA Western Maryland

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.5		$13.9	$8.6	$2.5
Federal Tax	$29.3	$3.2	$2.5	$11.4	$3.4
Projected Green Jobs (2012)					
State and Local Tax	$0.5		$14.3	$8.6	$2.5
Federal Tax	$29.5	$3.2	$2.5	$11.5	$3.4

WIA Level: Virginia

(15 WIA level model runs)

Virginia WIA I

Table 49. Total Economic Impact of Green Jobs in Virginia WIA I

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	1,400	$61.2	$92.5	$210.1
Indirect Effect	400	$18.4	$26.0	$58.7
Induced Effect	300	$11.0	$21.2	$35.5
Total:	2,200	$90.6	$139.6	$304.2
Projected Green Jobs (2012)				
Direct Effect	1,400	$55.7	$83.3	$190.2
Indirect Effect	400	$17.0	$24.0	$54.2
Induced Effect	300	$10.1	$19.4	$32.5
Total:	2,100	$82.7	$126.7	$276.9

Table 50. State/Local and Federal Tax Impacts in Virginia WIA I

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.3		$7.1	$1.6	$1.1
Federal Tax	$11.3	$0.7	$1.4	$2.8	$1.6
Projected Green Jobs (2012)					
State and Local Tax	$0.3		$6.3	$1.4	$1.0
Federal Tax	$10.3	$0.6	$1.2	$2.6	$1.5

Virginia WIA II

Table 51. Total Economic Impact of Green Jobs in Virginia WIA II

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	6,900	$282.0	$388.2	$855.5
Indirect Effect	1,400	$57.8	$88.3	$164.3
Induced Effect	1,800	$56.4	$106.6	$176.0
Total:	10,100	$396.1	$583.2	$1,195.8
Projected Green Jobs (2012)				
Direct Effect	7,400	$287.6	$397.6	$906.5
Indirect Effect	1,500	$61.0	$93.0	$172.1
Induced Effect	1,900	$57.8	$109.3	$180.3
Total:	10,700	$406.5	$599.8	$1,258.9

Table 52. State/Local and Federal Tax Impacts in Virginia WIA II

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$1.6		$22.6	$7.5	$4.2
Federal Tax	$41.9	$4.6	$3.4	$15.0	$6.4
Projected Green Jobs (2012)					
State and Local Tax	$1.7		$23.2	$7.7	$4.3
Federal Tax	$43.2	$4.5	$3.5	$15.4	$6.7

Virginia WIA III

Table 53. Total Economic Impact of Green Jobs in Virginia WIA III

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	5,800	$278.5	$371.8	$734.6
Indirect Effect	2,000	$88.7	$141.1	$245.4
Induced Effect	2,100	$80.6	$148.9	$240.4
Total:	9,900	$447.7	$661.7	$1,220.3
Projected Green Jobs (2012)				
Direct Effect	6,600	$305.4	$414.6	$807.7
Indirect Effect	2,100	$96.1	$153.0	$266.4
Induced Effect	2,300	$87.8	$162.3	$262.0
Total:	11,000	$489.4	$729.9	$1,336.2

Table 54. State/Local and Federal Tax Impacts in Virginia WIA III

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.8		$46.8	$9.2	$4.2
Federal Tax	$48.9	$3.9	$8.8	$20.3	$6.4
Projected Green Jobs (2012)					
State and Local Tax	$0.9		$54.1	$10.0	$4.6
Federal Tax	$53.7	$4.2	$10.2	$22.1	$7.1

Virginia WIA IV

Table 55. Total Economic Impact of Green Jobs in Virginia WIA IV

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	11,300	$457.3	$612.1	$1,275.2
Indirect Effect	1,800	$69.3	$113.5	$209.6
Induced Effect	2,800	$92.5	$173.5	$287.0
Total:	15,800	$619.2	$899.1	$1,771.7
Projected Green Jobs (2012)				
Direct Effect	12,000	$458.8	$615.8	$1,281.0
Indirect Effect	1,800	$71.1	$116.3	$215.3
Induced Effect	2,800	$93.2	$174.7	$288.9
Total:	16,600	$623.0	$906.8	$1,785.2

Table 56. State/Local and Federal Tax Impacts in Virginia WIA IV

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$1.7		$41.9	$12.2	$6.0
Federal Tax	$62.2	$7.4	$7.5	$25.9	$9.3
Projected Green Jobs (2012)					
State and Local Tax	$1.8		$42.6	$12.3	$6.1
Federal Tax	$62.7	$7.4	$7.6	$26.0	$9.4

Virginia WIA VI

Table 57. Total Economic Impact of Green Jobs in Virginia WIA VI

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	5,900	$266.2	$331.8	$535.1
Indirect Effect	1,300	$55.2	$97.6	$164.9
Induced Effect	1,900	$69.5	$136.5	$215.8
Total:	9,100	$390.9	$565.9	$915.9
Projected Green Jobs (2012)				
Direct Effect	6,500	$275.3	$350.2	$558.4
Indirect Effect	1,400	$58.0	$102.7	$173.2
Induced Effect	1,900	$72.3	$142.0	$224.6
Total:	9,800	$405.6	$594.9	$956.2

Table 58. State/Local and Federal Tax Impacts in Virginia WIA VI

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$1.7		$37.8	$10.3	$3.1
Federal Tax	$37.8	$4.1	$5.6	$25.0	$4.7
Projected Green Jobs (2012)					
State and Local Tax	$1.7		$42.8	$10.7	$3.3
Federal Tax	$39.4	$4.2	$6.3	$25.9	$5.0

Virginia WIA VII

Table 59. Total Economic Impact of Green Jobs in Virginia WIA VII

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	2,000	$99.0	$131.1	$346.4
Indirect Effect	900	$44.7	$67.4	$126.0
Induced Effect	1,000	$32.7	$61.3	$100.8
Total:	3,900	$176.4	$259.8	$573.2
Projected Green Jobs (2012)				
Direct Effect	2,200	$111.8	$147.0	$401.6
Indirect Effect	1,000	$49.7	$75.5	$139.8
Induced Effect	1,100	$36.4	$68.3	$112.3
Total:	4,300	$197.9	$290.9	$653.7

Table 60. State/Local and Federal Tax Impacts in Virginia WIA VII

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.4		$9.9	$3.7	$1.9
Federal Tax	$19.4	$1.5	$1.6	$8.0	$2.9
Projected Green Jobs (2012)					
State and Local Tax	$0.4		$12.5	$4.2	$2.1
Federal Tax	$21.9	$1.6	$2.1	$8.9	$3.2

Virginia WIA VIII

Table 61. Total Economic Impact of Green Jobs in Virginia WIA VIII

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	2,700	$106.5	$152.4	$382.6
Indirect Effect	800	$29.0	$44.9	$92.8
Induced Effect	700	$22.2	$42.6	$70.6
Total:	4,200	$157.7	$239.9	$546.0
Projected Green Jobs (2012)				
Direct Effect	2,800	$105.2	$151.6	$377.4
Indirect Effect	800	$28.3	$43.7	$90.2
Induced Effect	700	$21.9	$42.1	$69.7
Total:	4,200	$155.4	$237.4	$537.3

Table 62. State/Local and Federal Tax Impacts in Virginia WIA VIII

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.6		$8.6	$3.2	$1.9
Federal Tax	$16.9	$2.5	$1.3	$6.3	$2.9
Projected Green Jobs (2012)					
State and Local Tax	$0.6		$9.1	$3.2	$1.9
Federal Tax	$16.8	$2.4	$1.3	$6.3	$2.9

Virginia WIA IX

Table 63. Total Economic Impact of Green Jobs in Virginia WIA IX

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	11,700	$677.0	$986.3	$1,838.2
Indirect Effect	4,700	$245.5	$405.0	$688.6
Induced Effect	6,600	$268.2	$503.8	$811.6
Total:	23,000	$1,190.8	$1,895.1	$3,338.4
Projected Green Jobs (2012)				
Direct Effect	13,600	$778.8	$1,143.3	$2,098.8
Indirect Effect	5,300	$275.0	$452.8	$769.9
Induced Effect	7,500	$305.5	$573.7	$924.0
Total:	26,300	$1,359.3	$2,169.9	$3,792.7

Table 64. State/Local and Federal Tax Impacts in Virginia WIA IX

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$2.2		$129.0	$32.5	$14.6
Federal Tax	$126.4	$5.1	$25.6	$81.4	$22.4
Projected Green Jobs (2012)					
State and Local Tax	$2.5		$152.4	$37.1	$16.7
Federal Tax	$144.2	$5.9	$30.2	$92.8	$25.6

Virginia WIA XI

Table 65. Total Economic Impact of Green Jobs in Virginia WIA XI

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	16,400	$1,031.6	$1,395.9	$2,597.9
Indirect Effect	5,200	$336.7	$524.2	$851.8
Induced Effect	5,000	$234.6	$457.0	$707.4
Total:	26,600	$1,603.0	$2,377.1	$4,157.2
Projected Green Jobs (2012)				
Direct Effect	21,300	$1,347.6	$1,814.6	$3,232.5
Indirect Effect	6,300	$415.6	$645.0	$1,037.3
Induced Effect	6,400	$300.5	$585.5	$906.2
Total:	34,000	$2,063.7	$3,045.1	$5,175.9

Table 66. State/Local and Federal Tax Impacts in Virginia WIA XI

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$2.1		$133.9	$47.4	$16.2
Federal Tax	$157.0	$5.2	$24.8	$133.6	$25.0
Projected Green Jobs (2012)					
State and Local Tax	$2.8		$189.3	$61.0	$20.0
Federal Tax	$202.2	$6.6	$35.1	$171.9	$30.7

Virginia WIA XII

Table 67. Total Economic Impact of Green Jobs in Virginia WIA XII

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	5,500	$453.2	$546.4	$843.3
Indirect Effect	1,300	$91.3	$151.1	$233.1
Induced Effect	1,500	$78.7	$155.1	$234.4
Total:	8,300	$623.2	$852.6	$1,310.9
Projected Green Jobs (2012)				
Direct Effect	6,000	$466.1	$565.1	$876.2
Indirect Effect	1,400	$96.9	$160.5	$248.0
Induced Effect	1,600	$81.7	$161.1	$243.5
Total:	9,000	$644.7	$886.7	$1,367.6

Table 68. State/Local and Federal Tax Impacts in Virginia WIA XII

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.5		$36.3	$15.0	$4.9
Federal Tax	$56.9	$1.8	$7.0	$40.3	$7.5
Projected Green Jobs (2012)					
State and Local Tax	$0.5		$36.5	$15.5	$5.2
Federal Tax	$59.0	$1.8	$7.1	$41.7	$8.0

Virginia WIA XIII

Table 69. Total Economic Impact of Green Jobs in Virginia WIA XIII

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	6,200	$275.4	$332.3	$684.2
Indirect Effect	1,400	$64.9	$96.6	$186.1
Induced Effect	2,000	$70.2	$138.9	$224.5
Total:	9,700	$410.6	$567.8	$1,094.8
Projected Green Jobs (2012)				
Direct Effect	7,300	$334.5	$383.5	$759.1
Indirect Effect	1,500	$70.2	$105.2	$200.7
Induced Effect	2,400	$83.8	$165.9	$267.9
Total:	11,300	$488.5	$654.6	$1,227.8

Table 70. State/Local and Federal Tax Impacts in Virginia WIA XIII

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.9		$30.8	$11.0	$3.2
Federal Tax	$39.1	$4.3	$3.9	$26.1	$5.0
Projected Green Jobs (2012)					
State and Local Tax	$1.1		$36.5	$13.0	$3.3
Federal Tax	$47.0	$4.8	$4.6	$31.1	$5.1

Virginia WIA XIV

Table 71. Total Economic Impact of Green Jobs in Virginia WIA XIV

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	5,000	$255.3	$311.7	$545.9
Indirect Effect	1,000	$43.4	$73.5	$137.9
Induced Effect	1,600	$55.6	$108.2	$179.0
Total:	7,600	$354.3	$493.3	$862.7
Projected Green Jobs (2012)				
Direct Effect	5,600	$265.0	$324.2	$561.3
Indirect Effect	1,000	$45.0	$76.2	$142.9
Induced Effect	1,600	$57.8	$112.5	$186.2
Total:	8,300	$367.8	$512.9	$890.5

Table 72. State/Local and Federal Tax Impacts in Virginia WIA XIV

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.7		$30.4	$8.0	$2.7
Federal Tax	$32.0	$2.9	$5.4	$18.4	$4.2
Projected Green Jobs (2012)					
State and Local Tax	$0.7		$31.2	$8.3	$2.9
Federal Tax	$33.1	$3.1	$5.6	$19.1	$4.4

Virginia WIA XV

Table 73. Total Economic Impact of Green Jobs in Virginia WIA XV

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	1,900	$86.2	$124.7	$267.5
Indirect Effect	600	$25.7	$48.1	$91.1
Induced Effect	400	$16.2	$31.8	$54.3
Total:	2,900	$128.1	$204.6	$412.9
Projected Green Jobs (2012)				
Direct Effect	2,000	$86.5	$125.0	$269.5
Indirect Effect	600	$26.4	$49.4	$93.6
Induced Effect	500	$16.5	$32.3	$55.3
Total:	3,000	$129.4	$206.8	$418.4

Table 74. State/Local and Federal Tax Impacts in Virginia WIA XV

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.3		$9.8	$2.2	$1.7
Federal Tax	$11.6	$1.2	$2.4	$4.7	$2.6
Projected Green Jobs (2012)					
State and Local Tax	$0.3		$9.7	$2.2	$1.7
Federal Tax	$11.7	$1.2	$2.3	$4.7	$2.7

Virginia WIA XVI

Table 75. Total Economic Impact of Green Jobs in Virginia WIA XVI

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	26,600	$1,244.0	$1,496.2	$2,700.2
Indirect Effect	6,000	$263.3	$462.3	$774.7
Induced Effect	9,000	$338.4	$627.6	$1,032.9
Total:	41,500	$1,845.7	$2,586.1	$4,507.8
Projected Green Jobs (2012)				
Direct Effect	28,300	$1,269.2	$1,531.2	$2,750.2
Indirect Effect	6,100	$268.7	$470.0	$787.5
Induced Effect	9,200	$345.7	$641.0	$1,055.0
Total:	43,500	$1,883.6	$2,642.2	$4,592.7

Table 76. State/Local and Federal Tax Impacts in Virginia WIA XVI

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$3.1		$160.9	$38.9	$14.7
Federal Tax	$161.0	$15.5	$24.9	$88.6	$22.6
Projected Green Jobs (2012)					
State and Local Tax	$3.2		$169.6	$39.7	$14.9
Federal Tax	$164.0	$16.0	$26.3	$90.5	$22.9

Virginia WIA XVII

Table 77. Total Economic Impact of Green Jobs in Virginia WIA XVII

(million 2010$)

Impact Type	Employment	Labor Income	Value Added (GRP)	Economic Activity (Output)
Current Green Jobs (2010)				
Direct Effect	2,200	$94.4	$161.9	$366.8
Indirect Effect	600	$24.7	$36.4	$75.7
Induced Effect	600	$17.3	$33.3	$56.2
Total:	3,400	$136.3	$231.6	$498.7
Projected Green Jobs (2012)				
Direct Effect	2,400	$94.7	$162.3	$357.3
Indirect Effect	600	$24.1	$35.6	$74.1
Induced Effect	600	$17.4	$33.5	$56.4
Total:	3,600	$136.2	$231.3	$487.9

Table 78. State/Local and Federal Tax Impacts in Virginia WIA XVII

(million 2010$)

Description	Employee Compensation	Proprietor Income	Indirect Business Tax	Households	Corporations
Current Green Jobs (2010)					
State and Local Tax	$0.4		$16.9	$2.3	$2.0
Federal Tax	$15.5	$1.4	$3.0	$4.5	$3.0
Projected Green Jobs (2012)					
State and Local Tax	$0.4		$17.8	$2.3	$1.9
Federal Tax	$15.5	$1.4	$3.1	$4.5	$3.0