To approach modeling for the economic impact of Marcellus Shale drilling on Garrett and Allegany Counties in Western Maryland, RESI will use three modeling variations to arrive at an estimated complete impact to the region.

The first model will be a traditional input/output model for the natural gas industry. To gauge the impact of drilling, RESI will include an impact of drilling on three scenarios (high, medium, and low) of shale reserves. Estimates of the sizeof shale reserves in the region will be based on the United States Geological Survey data, along with Energy Information Agency estimates. Estimates for potential number of well pads, multi well pads, number of wells, and drilling per well will be collected to give an estimate of length of drilling and employment period.

Academic journal research and industry research will facilitate the data collection and inform on best methods when determining employment levels and costs. The data will then be collected and subjected to a rate of decline based on the lifetime usefulness of the wells and potential drilling forecast. This will form the base estimates associated directly with the industry on a year-to-year basis.

The second model, a contingent valuation approach, will be used to determine variables for the region that are not as easily measured in terms of dollar value. To determine a demand curve for the environmental amenities available in Garrett and Allegany Counties, RESI will conduct a series of surveys over a three- to four-day period in the region. The surveys will represent a statistically significant sample (given the total population) and collect variables on valuation of streams, parks, scenic viewsheds, rental community variables, and expectations by individuals should drilling take place in the region.

The variables will then feed into the third model, a hedonic model, to determine the potential loss to housing values that may result from drilling within the region. Housing models are difficult to assess, but the premiums paid by individuals for certain amenities can be determined through an implicit function of the housing model with respect to given variables (e.g. lake front view or dock access). The regression will estimate the impact these variables have on housing values within the region and the impact if a change were to occur (e.g. drilling).

The collection of results from the three models presented above will be run in both IMPLAN and REMI PI+.

IMPLAN is a static model that provides concise estimates for a one-year basis. The estimates will be county specific and determine the exact first-year impact from potential drilling on high, medium, and no drilling scenarios.

REMI PI+ is more of a "moving picture" and allows interactions across prices and industries to occur within the model. The model will forecast the impacts on the region past that first year of drilling and give an estimate of what may occur within the region afterward.

Results from the REMI analysis will then be reported by employment (direct, spin-off, and total), wages (direct, spin-off, and total), and output (direct, spin-off, and total). Direct impacts are

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impacts that are a direct result of the policy change. For example, the hiring of an employee to manage the well is a direct impact from the policy change. Spin-off impacts include both indirect and induced effects. Indirect effects would include a local vendor's sale of tools or safety equipment to the company for crews working at the wells, whereas the induced effects include the company's employee spending his or her new disposable income on a dinner away from home.

Figure 1 shows a diagram of the aforementioned model for the Marcellus Shale project. Figure 1 accurately represents how the pieces described above will be used in the economic analysis of the impacts from Marcellus Shale drilling. The first lines show the three forms of economic models described above, followed by the variables that will be used to calculate the rate or size of impact of each variable on the region. A rate of change variable will be used to assist RESI in the forecast of future impacts, and this is indicated in the diagram in Figure 1. The visual representation is a supplement to the above information.

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Figure 1: Economic Modeling Diagram