



Summary of Macroeconomic Analysis: Pennsylvania Action Plan

A rigorous macroeconomic analysis of the [Pennsylvania Climate Action Plan](#) recommendations for limiting greenhouse gases (GHGs) indicates that their full implementation would yield strongly positive overall economic impacts. Specifically, the policies and measures analyzed by the Center for Climate Strategies (CCS) taken together show:

- An increase in total gross state product (GSP) in net present value (NPV) of about \$5.08 billion for the period 2009-2020
- Creation of 53,000 new jobs by 2020

Macroeconomic analysis of the Pennsylvania climate plan was conducted as part of the state's stakeholder process. The Pennsylvania Climate Change Advisory Committee (CCAC) developed a broad set of 52 recommendations across all sectors of the state's economy. Of these, 42 could be quantified for their GHG reductions and cost effectiveness. To provide a macroeconomic analysis of the recommendations, CCS used the Regional Economic Models, Inc. (REMI) Policy Insight Plus/PI+ model. This is the most widely used state level economic modeling software package in the U.S. and is heavily peer reviewed. The study was conducted by CCS with Dr. Adam Rose and Dr. Dan Wei of the University of Southern California as lead researchers and authors. Dr. Rose is an internationally recognized expert on energy and environmental policy and economics. Dr. Wei has developed economic data and done REMI analyses for multiple state climate action plans.

The macroeconomic impacts of the majority of the recommendations are positive. Implementing these policies and measures will bring a positive stimulus to the Pennsylvania economy by increasing Gross State Product and creating more jobs.

The macroeconomic impacts of 27 of the 42 recommendations are positive, which means implementing these policies and measures will bring about a positive stimulus to the Pennsylvania state economy by increasing the Gross State Product and creating jobs.

Recommendations for Commissioning and Retro-Commissioning PA Buildings (Residential/Commercial-5) and Industrial Natural Gas and Electricity Best Management Practices (Industry-2)) yield the highest positive impacts on the economy—a GSP NPV of \$4.94 billion; measure Electricity-9 (Combined Heat and Power) results in the highest negative impacts to the economy—a GSP NPV of -\$3.24 billion.

Mitigation recommendations from the Residential and Commercial building sector and the Industrial Sector would yield the highest positive GSP impacts on the economy, followed by the Agriculture sector and Waste Management sector.

The impacts of the various recommendations vary significantly by sector of Pennsylvania's Economy. Producers of energy efficient equipment benefit from increased demand for their products, as will most consumer goods and trade sectors because of increased demand stemming from increased purchasing power. The top five positively impacted sectors in terms of NPV of GSP are, in descending order, Real Estate, Transit and Ground Passenger Transportation, Waste Collection; Waste Treatment and Disposal and Waste Management, Offices of Health Practitioners¹, and Monetary Authorities, Credit Intermediation.

Electric Utilities related to fossil fuels, including gas pipelines will witness a decline. In fact, the Electric Power Generation, Transmission, and Distribution sector is expected to have the largest negative impact — \$7.38 billion (NPV). Other negatively affected sectors in descending order of impacts are Petroleum and Coal Products Manufacturing; Natural Gas Distribution; Coal Mining; Water, Sewage, and Other Systems; and Pipeline Transportation. However, none of these sectors is expected to have a decline of more than \$0.4 billion. The CCAC's recommendations for measures in these sectors relates to their ability to greatly reduce GHG emissions.

From a jobs perspective, 28 of 42 policies yield positive impacts. By 2020, for the simple summation results, these new jobs accumulate to about 40,000 full-time equivalent (FTE) jobs generated directly and indirectly by implementing the Climate Action Plan. This represents an increase over baseline projections of 0.52%. For the simultaneous simulation case (in which all measures are implemented at the same time), the gains are projected to be 52,996 FTE, or an increase of 0.71%. by year 2020.²

The simulation results indicate that policies and measures that reduce GHGs in the Residential and Commercial, Forestry, and Industrial sectors would create more jobs than the mitigation measures in other sectors.

These estimates of economic benefits to Pennsylvania represent a lower bound from a broader perspective. They do not include the avoidance of damage from the climate change that continued baseline GHG emissions would bring forth, the reduction in damage from the associated decrease in ordinary pollutants, the reduction in the use of natural resources, the reduction in health costs from reduced pollution, the reduction in traffic congestion, etc.

Overall, the *Pennsylvania Climate Action Plan* is a win-win policy.

¹ The increased activity in this sector stems not from any increase in healthcare needs but rather from the fact that consumer disposable income has increased.

² The employment impacts in the REMI model are presented as annual differences from the baseline scenario; they cannot be summed across years to obtain cumulative results. If a firm opens in 2010 creating 100 new jobs, and stays open in 2011, 2012, etc. the state will have 100 more jobs. But we cannot say the total number of jobs created is 100 + 100 + 100. Every year it is the *same* 100 jobs that persist over time.

The full Pennsylvania Macroeconomic Assessment and an Executive Summary are available on the CCS Website at: - [CCS Macroeconomic Studies](http://www.climatestrategies.us/template.cfm?FrontID=6032) [<http://www.climatestrategies.us/template.cfm?FrontID=6032>].