

**An Assessment of the Economic Impacts on the State of Arizona of the
Imposition of a GHG Emission Allowance Trading Program**

Arizona Investment Council

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Executive Summary

- The member U.S. States and Canadian provinces of the Western Climate Initiative (WCI) and the U.S. federal government are developing a cap-and-trade system designed to limit the emission of greenhouse gases in the western region and the U.S. As currently structured, the WCI cap-and-trade system is scheduled to commence in 2012. Such programs achieve reductions in emissions through use of the market system, increasing the costs of energy and other products.

Model and Assumptions

- Making use of Arizona's REMI regional forecasting model, the L. William Seidman Research Institute - W.P. Carey School of Business Arizona State University have provided an assessment of the impact of the imposition of a greenhouse gas (GHG) emission allowance trading program, such as the WCI cap-and-trade system, on the State's economic activity in terms of macroeconomic measures such as gross state product, employment, income, and population. Our forecasts would be valid even if a "carbon price" is derived via alternative mechanisms such as a carbon tax or a cap-and-trade program at the federal level. This is important to note because there is a growing probability that some mechanism (cap-and-trade system or carbon taxes) to reduce emissions of greenhouse gases will be implemented in the near future, be it at the state, regional or federal level.
- *Key Assumptions:* The study assumes that all allowances would be sold at auction as the means of allocation with three equilibrium price scenarios of \$30, \$60 and \$100 per ton. Utilities and the distributors of gasoline, diesel, and other fuels would be required to purchase allowances in order to distribute electricity and carbon-based fuels. At the commission of this analysis the WCI was proposing the auction of 100% of allowances with support from the Obama administration. Thus throughout it has been assumed all allowances would be auctioned. If *less* than 100 percent of the allowances were auctioned, with the remainder allocated "free of charge" then the negative macroeconomic impacts of such a cap-and-trade program could potentially be lessened. It should be noted that there

are many different ways to allocate "free" emission allowances and these affect the degree to which the negative economic impacts are reduced. However, even if 100 percent of allowances were free, there would still be economic costs.¹ The cost of the allowances would have three primary *direct* effects: (1) production costs of the utilities and fuel distributors would increase by the cost of the allowances; (2) the increased cost of supplying electricity and fuels would increase their market prices; (3) the proceeds from the sale of the allowances would also have a direct economic impact to the extent that they were recycled in some way back into the Arizona economy.

- *Policy Scenarios:* Four alternative policy scenarios related to the use of the proceeds from the sale of the allowances were evaluated:
 - Scenario 1 - no distribution of the proceeds flow back into the state's economy.
 - Scenario 2 - a portion of the proceeds from the allowances would be used to fund research, development and deployment of renewable energy in Arizona.
 - Scenario 3 - one-half of the proceeds from the allowances would be used to support the state's General Fund budget.
 - Scenario 4 - 95 percent of the proceeds from the allowances would be used to support the state's General Fund budget.²

Results

- All forecasts are presented against a baseline for the Arizona economy, which assumes that all current Renewable Energy Standard (RES) requirements will be met, but that there is no WCI cap-and-trade system instituted.

¹ Assuming that the total number of allowances creates a binding constraint.

² 5% of the revenues are assumed to be allocated to administration. This estimate is consistent with reported administrative costs for other similar programs such as the Regional Greenhouse Gas Initiative.

- There are three key general findings:
 1. The imposition of a GHG emission allowance trading program would have *significant net negative* impacts on the Arizona economy over the 2012-2020 study period. For most of the macroeconomic measures, the negative impacts *grow* over the period.
 2. The size of the negative impacts is *directly related* to the price of the allowances - a \$100 price for the CO₂ allowances is estimated to have approximately three times the effect of a \$30 price.
 3. The *higher* the percentage of proceeds "recycled" back into the Arizona economy, the *smaller* the negative effects - but in all scenarios they remain negative.
- The following table presents the effects of a \$30 equilibrium price for allowances under the four scenarios outlined above. The economic impacts of the \$60 and \$100 cases are more negative.

Economic Impact of a \$30 Price per Allowance Relative to Baseline

	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
	2012	2020	2012	2020	2012	2020	2012	2020
Gross State Product	-0.86%	-1.19%	-0.81%	-0.97%	-0.63%	-0.96%	-0.41%	-0.73%
Total Employment	-0.87%	-1.04%	-0.80%	-0.83%	-0.55%	-0.71%	-0.24%	-0.40%
State Revenues³	-1.46%	-1.59%	-1.38%	-1.38%	-0.38%	-0.65%	0.55%	0.18%
Retail Trade	-1.26%	-1.42%	-1.22%	-1.25%	-0.98%	-1.12%	-0.71%	-0.83%
Real Disposable Personal Income per Capita	-1.47%	-0.56%	-1.43%	-0.49%	-1.20%	-0.48%	-0.94%	-0.40%
Population	-0.22%	-1.00%	-0.21%	-0.90%	-0.17%	-0.74%	-0.12%	-0.49%
Personal Income	-0.53%	-0.81%	-0.49%	-0.64%	-0.35%	-0.58%	-0.17%	-0.35%
PCE⁴ Price Index	1.19%	0.76%	1.19%	0.77%	1.22%	0.79%	1.22%	0.80%

³ At average rates.

⁴ Personal Consumption Expenditure.

- The case/scenario that leads to the smallest overall net negative impact ("best-case outcome") is scenario 4 (95 percent recycling), with an allowance price of \$30. This is presented in the final two columns of the table above. The case/scenario that leads to the highest overall net negative impact ("worse-case outcome") is scenario 1 (zero recycling), with an allowance price of \$100. The table below summarizes the economic impact (percentage and level terms) under the best and worst case outcome, relative to the baseline.

Economic Impact Under "Best Case" and "Worst Case" Outcomes Relative to Baseline

	"Best Case" (95% revenue recycling, allowance price of \$30 per ton)		"Worst Case" (0% revenue recycling, allowance price of \$100 per ton)	
	2012	2020	2012	2020
Gross State Product	-0.41% (-\$1.33 billion)	-0.73% (-\$3.31 billion)	-2.3% (-\$7.56 billion)	-3.2% (-\$14.7 billion)
Total Employment	-0.24% (-9,000)	-0.40% (-17,000)	-2.3% (-87,000)	-2.8% (-124,000)
State Revenues⁵	0.55% (\$0.2 billion)	0.18% (\$0.08 billion)	-4% (-\$1.37 billion)	-4.34% (-\$1.92 billion)
Retail Trade	-0.71% (-\$0.3 billion)	-0.83% (-\$0.5 billion)	-3.4% (-\$1.25 billion)	-3.9% (-\$2.1 billion)
Real Disposable Personal Income per Capita	-0.94% (-\$290)	-0.40% (-\$130)	-4% (-\$1200)	-1.4% (-\$440)
Population	-0.12% (-9,000)	-0.49% (-43,000)	-0.6% (-44,000)	-2.9% (-249,000)
Personal Income	-0.17% (-\$0.4 billion)	-0.35% (-\$1.4 billion)	-1.4% (-\$3.7 billion)	-2.2% (-\$8.9 billion)
PCE Price Index	1.22%	0.80%	3.3%	2.1%

- Job Losses Across Industries: Initially, job losses, relative to the baseline, are likely to disproportionately affect the top 20 energy-intensive industries. Job losses in the top 20 energy-intensive industries would be 14,000 in 2012⁶ (approximately 27% of the total private sector job losses).⁷ Over time, the relative magnitude of the impacts would become more evenly spread across the Arizona economy. By 2020 the differences in the relative

⁵ At average rates.

⁶ Based on Scenario 1 with a \$60 CO₂ Price.

⁷ It is disproportionate since the overall employment share for the top 20 energy-intensive industries is only 21% of the total private sector job.

magnitude of the negative impacts on employment would shrink to 1.83% for the top 20 energy-intensive industries, against 1.74% for the less energy-intensive sectors.

- *Household Impact:* Examining personal income at the household level, each household in Arizona on average would suffer a fall equal to approximately \$160-\$1,350 (2009\$) in 2012 relative to the baseline. These losses would increase to approximately \$360-\$2,320 (2009\$) by 2020. Cumulatively, the average household would suffer a loss of \$2,400-\$18,200 (2009\$) over the study period.

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1. Introduction

The U.S. States and Canadian provinces that make up the Western Climate Initiative are developing a cap-and-trade system designed to limit the emission of greenhouse gases in the region that is scheduled for implementation in 2012. By design, such a program achieves reductions in emissions through use of a market system that will increase the costs of energy and other products.

This report summarizes an analysis of the potential economic impacts of the imposition of a greenhouse gas (GHG) emission allowance trading program, such as the WCI cap-and-trade system, on the Arizona economy. The goal of the study is to provide stakeholders in the state with an assessment of what this program would do to state economic activity in terms of macroeconomic measures such as gross state product, employment, income, and population. These results would hold even if a "carbon price" is derived via alternative mechanisms such as a carbon tax or a cap-and-trade program at the federal level.

This is important to note because there is a growing probability that some mechanism – cap-and-trade system or introducing carbon taxes - to reduce emissions of greenhouse gases will be implemented in the near future, be it at the state, regional or federal level - especially since Congress is currently considering sweeping legislation that would implement a federal cap-and-trade system potentially as early as 2012. The study was undertaken at the request of the Arizona Investment Council.

Section 2 discusses the Western Climate Initiative and its proposed GHG emission allowance trading program. A summary of previous empirical analyses of the macroeconomic effects of such programs is presented in Section 3. Section 4 contains a brief discussion of the study methodology. Section 5 contains our simulation results. Section 6 provides a discussion of the effects of the imposition of a GHG emissions allowance trading program on the relative competitiveness of the Arizona economy. Final conclusions are contained in Section 7.

2. The Western Climate Initiative Cap-and-Trade Program

The Western Climate Initiative (hereafter referred to by the acronym "WCI"), launched in February 2007, is a collaboration of the Governors of seven U.S. States (Arizona, California, Montana, New Mexico, Oregon, Utah, and Washington) and the Premiers of four Canadian provinces (British Columbia, Manitoba, Ontario, and Quebec). WCI was created to identify, evaluate, and implement collective and cooperative ways to reduce greenhouse gases (hereafter referred to by the acronym "GHG") in the region, focusing on a market-based cap-and-trade system.

In August 2007, the WCI partners announced their regional goal to collectively reduce GHG emissions 15% below 2005 levels by 2020, consistent with previously established state and provincial goals. The partners also announced their intention to design a regional market-based multi-sector mechanism to help achieve the goal by August 2008.

A cap-and-trade system sets a limit, or cap, on the amount of GHG emissions and creates a system of allowances that allow the owner to emit a certain amount of GHG, with the total quantity of allowances equal to the limit on emissions. Companies or other groups must hold allowances equal to or greater than their current level of emissions. It then creates a market for GHG emissions by allowing holders of allowances to buy or sell them.

WCI released a draft design of a regional market-based cap-and-trade-program in July 2008 as part of its effort to achieve the 2020 goal to limit carbon emissions of the member states. The system is designed in a way to allow all members of the WCI to participate under one cap. Each member state or province will be permitted to issue a number of allowances with the number likely to at least partially based on projected emissions. A particularly important feature of the WCI cap and trade program is the trading of allowances among private parties. The WCI cap-and-trade system targets all GHG emitters which produce over 25,000 metric tons of carbon equivalents annually. Carbon equivalents include: carbon dioxide, methane, nitrous oxide, hydro-fluorocarbons, per-fluorocarbons, and sulfur hexafluoride.

At the start date, utilities will be the primary target for emissions reductions, with industrial, commercial, residential, and transportation emissions being regulated in the following few years. Many utility companies are already required to meet state or board mandated renewable energy standard goals in the next 10-15 years, which will assist them in meeting the requirements of the WCI.

Under the WCI program, the member states will agree on an allocation of emission allowances to be distributed by each state or province. Initially, these allowances are likely to be equal to expected emissions in 2012, but over time the amount will drop to encourage investment in cleaner energy sources. At this time, the WCI has not decided on whether the allowances will be distributed based on historic emissions or power output. The difference is significant because distributing allowances based on power output is extremely beneficial to states that are already low emitters or have significant hydroelectric energy sources.

After the WCI distribution, each member state determines how to distribute the allowances to private parties. In the first year, the state is required to auction at least 10% of the allowances, but is allowed to auction all allowances. Assuming that a state will auction all allowances, a bidding process will start for the allowances. As the system progresses past 2012, the price of energy sources that emit will substantially increase due to the cost of allowances and the shrinking emissions cap. The rising cost of energy will have a negative impact on state economies by reducing the amount of money consumers have to spend elsewhere. Potentially limiting the amount of greenhouse gases emitted affects more than those that are being directly regulated. As a result of the cap-and-trade system, the price of energy will increase, with subsequent effects on employment, the cost of goods and services, gross state product, population growth, and many other factors.

3. Related Empirical Studies

Similar economic analyses have estimated the macroeconomic impacts of green house gas reduction programs at both the national and state levels.

3.1 National Studies

Below is a brief description of various studies that have estimated the macroeconomic impacts of a GHG reduction program conducted under a national context.

3.1.1 American Council for Capital Formation (1995)

A study conducted by DRI/McGraw-Hill for the ACCR assessed the economic impacts of different levels of a carbon tax on the U.S. economy assuming the tax would be phased in over the 1995-2000 period and maintained through 2010. Most of the analysis was based on a \$100 (in 1992\$) per metric ton case. The simulation results indicated the tax would reduce real GDP by 2.3 percent, and real disposable income was forecast to decline by 1.2 percent by 2010. Annual job losses would average 520,000 over the 1995-2000 period with a peak impact of 1 million jobs (0.7 percent).

3.1.2 Electric Power Research Institute (1998)

An analysis by Charles River Associates and DRI/McGraw-Hill for EPRI examined the regional impacts of a national carbon tax. Focusing on the West, the results forecast that a tax of \$100 per metric ton would have negative effects on real personal income but positive impacts on employment and population. The study found a carbon tax would produce much more negative impacts for the Midwest and the South.

3.1.3 Energy Information Administration (2008)

The Lieberman-Warner Climate Security Act (hereafter referred to as "L/W") would implement a nationwide cap-and-trade program for the emissions of greenhouse gases. L/W sets targets that would reduce GHG emissions to 15 percent below 2005 levels by 2020; 30 percent below 2005 levels by 2030; and 70 percent below 2005 levels by 2050. The EIA's analysis of the potential economic impacts of the cap-and-trade program in L/W investigated several alternative scenarios and forecast losses in real output and consumption - estimates of

decreases in GDP in the range of 0.3-0.9 percent and in personal consumption of 0.4-1.2 percent in 2020.

3.1.4 ACCF/NAM (2008)

The impacts L/W on the U. S economy were also the subject of a study prepared by Science Applications International Corporation (SAIC) for ACCF and the National Association of Manufacturers. The simulation results forecast that the United States would lose between 1.2 and 1.8 million jobs in 2020 and between 3 and 4 million jobs in 2030. High energy prices, fewer jobs, and loss of industrial output were estimated to reduce GDP by between \$151 billion and \$210 billion per year by 2020 and \$631 billion and \$669 billion by 2030.

3.1.5 Pew Center for Global Climate Change (2009)

The analysis by Aldy and Pizer focused on the potential competitiveness impacts on U.S. industry of a cap-and-trade system for carbon. The study indicates that, at a carbon dioxide price of \$15 per ton, the competitiveness concern does not extend to the economy as a whole, but rather centers on a fairly narrow segment of U.S. industry—energy-intensive industries whose goods are traded internationally. They found that higher energy prices, of the sort associated with pricing CO₂ at \$15 per ton, would lead to an average production decline of 1.3 percent across U.S. manufacturing and a 0.6 percent decline in consumption (defined as production plus net imports). Aldy and Pizer's results identified no statistically discernible effect on employment for the manufacturing sector as a whole.

3.1.6 EIA (2009)

Recently the EIA released preliminary estimates of the economic impact of the Waxman-Markey Bill (The American Clean Energy and Security Act of 2009). In their core scenario they estimate by 2030 that GDP will be lower by 0.5-1.2%, electricity prices would be 22% higher and household expenditure on energy (excluding gasoline) would be 9% higher.⁸

⁸ All figures are relative to their baseline forecast.

3.2 The Regional Greenhouse Gas Initiative

The Regional Greenhouse Gas Initiative (hereafter "RGGI") is a regional initiative by states and provinces in the northeastern region to reduce GHG emissions. Ten states currently participate in the initiative. In August 2005, the RGGI proposed a cap-and-trade program that would start in 2009 and lead to a stabilization of emissions at current levels (an average of 2002-2004 levels) by 2015. This would be followed by a 10% reduction in emissions between 2015 and 2020. The RGGI has implemented its system for CO₂ emissions from fossil fuel power plants with 25 MW or greater generating capacity in the member states. Emission permit auctioning began in September 2008, and the first three-year compliance period began on January 1, 2009. Proceeds will be used to promote energy conservation and renewable energy. To date RGGI auction prices have been low due to the over allocation of allowances in the early years of the program.

Competing studies of the potential economic impacts of RGGI prepared prior to the start of the cap-and-trade system produced conflicting results.

3.2.1 Charles River Associates (2004)

This report, commissioned by the American Council for Capital Formation's Center for Policy Research, summarized the results of an analysis of the costs of capping carbon emissions from electric generators. The study forecast that prices would rise by 9 to 23 percent in 2010 and 14 to 34 percent in 2020, but only modest negative economic impacts were predicted. The region would lose 18,000 to 57,000 jobs in 2010 and 33,000 to 83,000 jobs in 2020. The gross regional product would fall by 0.1 to 0.3 percent in 2010 and 0.2 to 0.5 percent in 2020.

3.2.2 Economic Development Research Group (2006)

The Economic Development Research Group evaluated the potential economic impacts of the RGGI cap-and-trade system for the Staff Working Group of the Northeast Regional Greenhouse Gas Initiative using a multi-state REMI model. The EDRG results predicted small positive economic impacts over the 2009 - 2021 period with real gross regional product 0.01 percent higher, real personal income 0.02 percent higher by the end of the period, and private sector job

gains of 0.01 to 0.02 percent. The analysis explained these results as "the combined effects of generating technology investments (traditional, renewable and energy efficient) and bill savings eventually outweighing the effect of higher electric prices."

3.3 Western Climate Initiative

3.3.1 ICF International and Systematic Solutions (2008)

The WCI partner jurisdictions commissioned ICF International and Systematic Solutions for an economic analysis using their ENERGY 2020 model. The study estimated the effects of the WCI cap-and-trade program in combination with a suite of complimentary energy efficiency programs on economic variables directly related to energy markets, such as energy/fuel costs and consumption, etc. but did not include forecasts of the effects on broader measures of economic activity.

3.3.2 Electric Power Research Institute (2008)

The Electric Power Research Institute has investigated the impacts of possible alternative prices for CO₂ emission allowances on western power markets in a collaborative research project with nine participating power producers. This research does not go on to evaluate the macroeconomic effects of its results. Some of the information from this research relating the impacts of CO₂ prices on electricity/fuel prices has been used as inputs in the Seidman Institute's economic impact analysis.

3.4 Arizona-Specific Studies

3.4.1 ACCF/NAM (2008)

As part of their contract, SAIC also produced state-level forecasts of the potential economic impacts of cap-and-trade system in the Lieberman-Warner Climate Security Act. According to the results of the SAIC analysis, energy prices would rise significantly under L/W. The price of

gasoline in Arizona would increase between 74 percent and 140 percent by 2030, while electricity prices would increase by 96 percent to 133 percent. Arizona residents would pay between 113 percent and 154 percent more for their natural gas by 2030. Arizona would lose 23,067 to 34,699 jobs in 2020 and 63,505 to 84,543 jobs in 2030. The higher energy prices, fewer jobs, and loss of industrial output are estimated to reduce Arizona's gross state product (GSP) by between \$2.6 and \$3.6 billion per year by 2020 and \$9.6 and \$11.3 billion by 2030 (2007\$).

4. Study Method

This study makes use of an Arizona-specific version of the REMI regional forecasting model to produce numeric estimates of the impact on the Arizona economy of the imposition of a GHG emission allowance trading program. The method for estimating the impact fundamentally involves 4 steps:

1. Preparation of a baseline forecast for the state economy – this baseline scenario provides a forecast of the future path of the Arizona economy based on a combination of the extrapolation of historic economic conditions and an exogenous forecast of relevant national economic variables assuming no material changes in public policy or other external factors. This baseline forecast implicitly assumes that Arizona's current Renewable Energy Standard (RES) remains in place and the relevant targets within the time horizon of the study are met.
2. Development of a policy scenario – this policy scenario describes the direct effects that the imposition of a GHG emission allowance trading program would have on the Arizona economy. Twelve policy scenarios were examined in the current study. They include 4 different assumptions about how auctioned CO₂ emission allowance proceeds are retained (or "recycled") through the state economy, and each of these scenarios was tested at 3 different price levels for the allowances: \$30, \$60 and \$100 per ton of emissions.⁹ Because of the highly uncertain nature of any allowance price projection,

⁹ This study is not attempting to predict future CO₂ emission allowance prices resulting from the adoption of the proposed cap-and-trade policy.

testing a range of possible allowance prices helps to put some reasonable bounds around the expected outcome.

3. Preparation of a forecast simulation of the state economy based on the policy scenario – this alternative forecast provides a simulation of the future path of the Arizona economy incorporating the effects of the changes specified in the policy scenario.
4. Comparison of the baseline and policy scenario forecasts – the differences between the future values of each variable in the forecast results provide numeric estimates of the nature and magnitude of the impact of the imposition of a GHG emission allowance trading program on the Arizona economy.¹⁰

For the purposes of this analysis, four alternative policy scenarios related to the use of the proceeds from the sale of the allowances were developed:

1. Scenario 1 assumes no distribution of the proceeds flow back into the state’s economy. Thus, this scenario focuses on the impacts that the increased cost of production and the price increases for electricity and fuels would have on the state’s economy.
2. Scenario 2 assumes that a portion of the proceeds from the allowances would be used to fund research, development and deployment of renewable energy in Arizona. Given the current paucity of production facilities for renewable energy equipment currently in the state, the portion of allowances distributed to this purpose starts at 25 percent in 2012 and is increased by five percentage points per year until it reaches 50 percent in 2017, and it remains at 50 percent for 2018 through 2020. This assumption recognizes the fact that, especially in the early years of the program, allowance proceeds will be paid to out-of-state manufacturers and project developers. It is a debatable question as to how much of the investment in renewable energy equipment may ever be captured by manufacturing facilities employing Arizona workers. These funds were assumed to be allocated in the following manner: 25 percent of the funding was allocated to research and development and the remaining 75 percent was allocated to the development of

¹⁰ See the Technical Appendix for a detailed methodology explanation.

new wind and solar thermal electric generating capacity to replace existing CO₂-emitting plants.¹¹

3. Scenario 3 assumes that one-half of the proceeds from the allowances would be used to support the state's General Fund budget.
4. Scenario 4 - 95 percent of the proceeds from the allowances would be used to support the state's General Fund budget.¹²

5. Simulation Results

The simulations indicate that the imposition of a GHG emission allowance trading program in 2012 would have significant negative impacts on the Arizona economy over the 2012-2020 study period. As would be expected, the magnitude of the negative impacts is directly related to the resulting price of the allowances - a \$100 price for the CO₂ allowances is estimated to have approximately three times the effect of a \$30 price. The alternative assumptions as to the distribution of the proceeds from the sale of the CO₂ allowances produced relatively similar results. Scenario 1 with no "recycling" of the proceeds had relatively larger negative impacts, but in most cases the results from the other two scenarios were only slightly smaller. In the results that follow, the best outcome is the low allowance price case (\$30) with 95% of the proceeds returned to the state's general fund. The worst outcome is the high allowance price case (\$100) but where none of the auction proceeds are re-invested in the state.

Figures 1 through 30 summarize the GHG emission allowance trading program's economic impacts on gross state product (GSP), total employment, personal income, disposable per capita income, retail trade, state general revenues, and population. The simulation results are measured in percentage change terms in Figures 1 through 30 (and most of the other figures and tables in the report) since that is the most efficient way to portray the magnitude of the impacts across many different economic variables measured in differing units - numbers of workers for employment, millions of dollars for GSP, etc. Results that are reported in dollar-denominated terms are stated in terms of 2009\$.

¹¹ Consistent with CPUC Decision 07-09-042.

¹² 5% of the revenues are assumed to be allocated to administrating the program. This is consistent with reported administrative costs for other similar programs (Regional Greenhouse Gas Initiative).

Appendix Tables A1 through A8 provide the complete set of the percent changes data for each of the eight variables for each scenario and each alternative price for the CO₂ allowances on which Figures 1 through 40 are based.

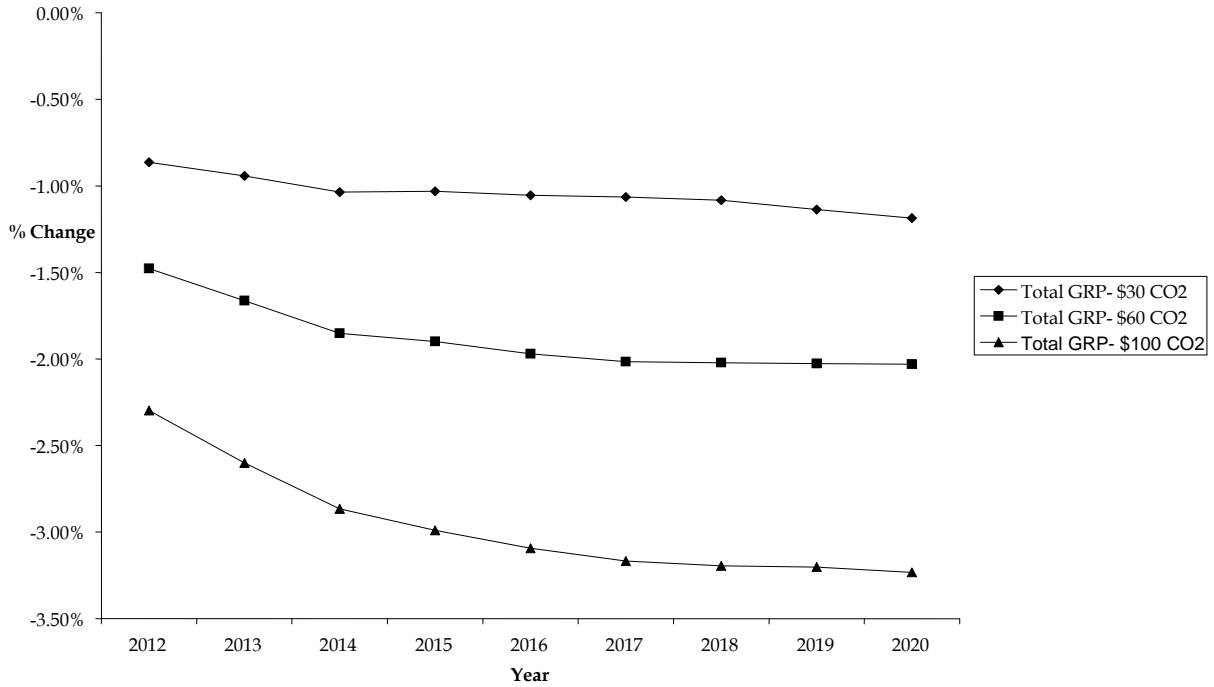
5.1 Gross State Product

Gross state product (GSP) is the dollar value of all goods and services produced in Arizona for final demand (that is, it is not equivalent to output, which includes the production of intermediate goods). Based on the results of the set of REMI simulations, the imposition of a GHG emission allowance trading program would reduce Arizona GSP from 0.4 percent to 2.3 percent when implemented in 2012 depending upon the ultimate price of CO₂ allowances and of the distribution of the proceeds from their sale (see Figures 1, 2, 3 and 4). These percent changes represent a loss of from \$1.33 billion to \$7.56 billion (2009\$). The magnitude of the decline would increase through time, growing to declines of 0.7 to 3.2 percent - equivalent to \$3.31 billion to \$14.7 billion (2009\$) - by 2020.

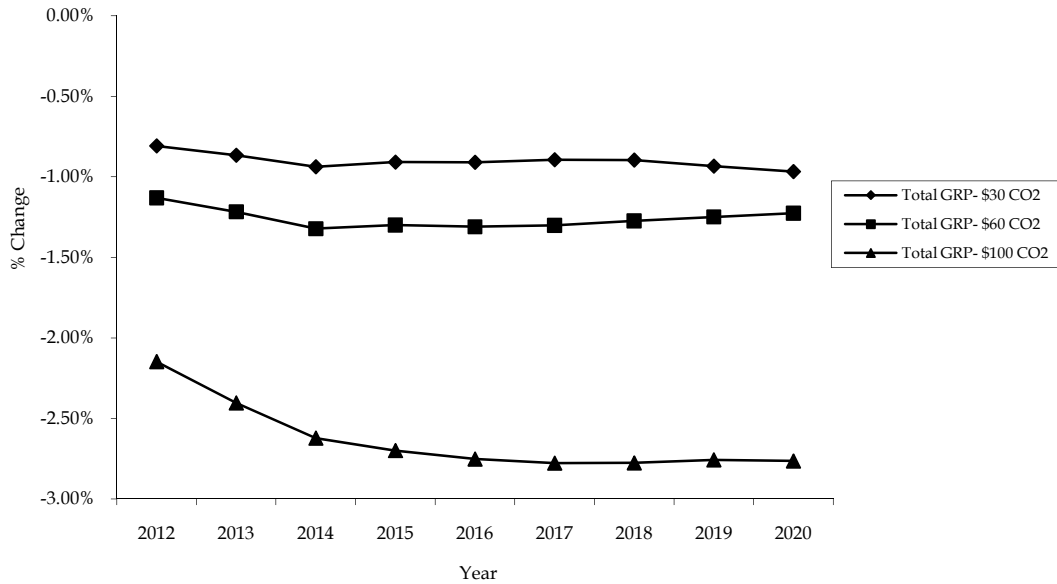
Greatest impacts in percentage terms would fall on the Construction, Utilities, Real Estate, and Retail sectors (see Appendix Tables A9 through A12). In dollar terms, the largest impacts would be in the Retail, Manufacturing, Wholesale Trade, and Construction sectors - together accounting for 40 percent of the total decline in GSP in 2012.¹³

¹³ This share would be very similar for all alternative simulations; in this case the calculation was based on the results from Scenario 1 with a \$60 price for the CO₂ allowances.

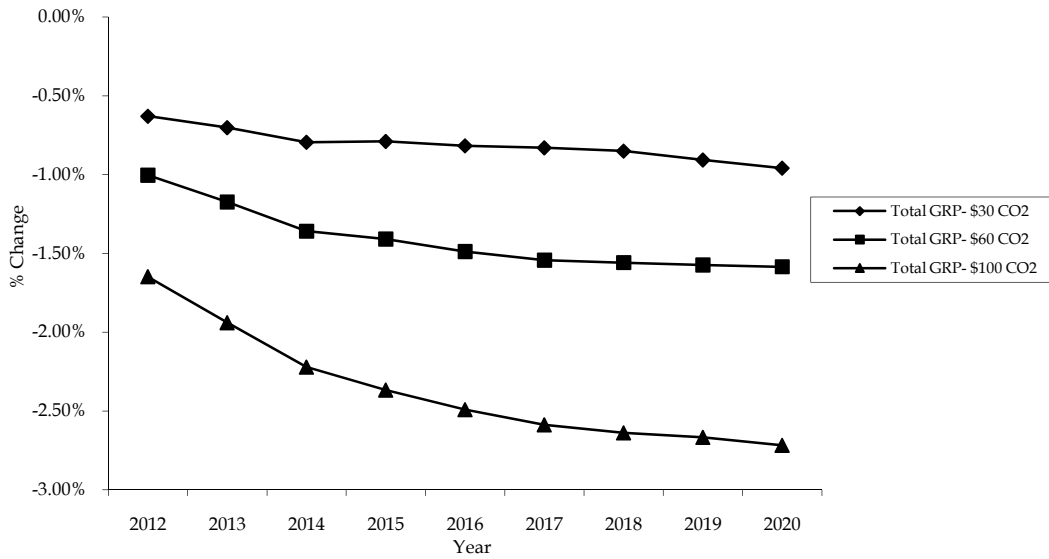
**Figure 1: Scenario 1 - No Distribution of Allowance Revenue
Gross Regional Product**



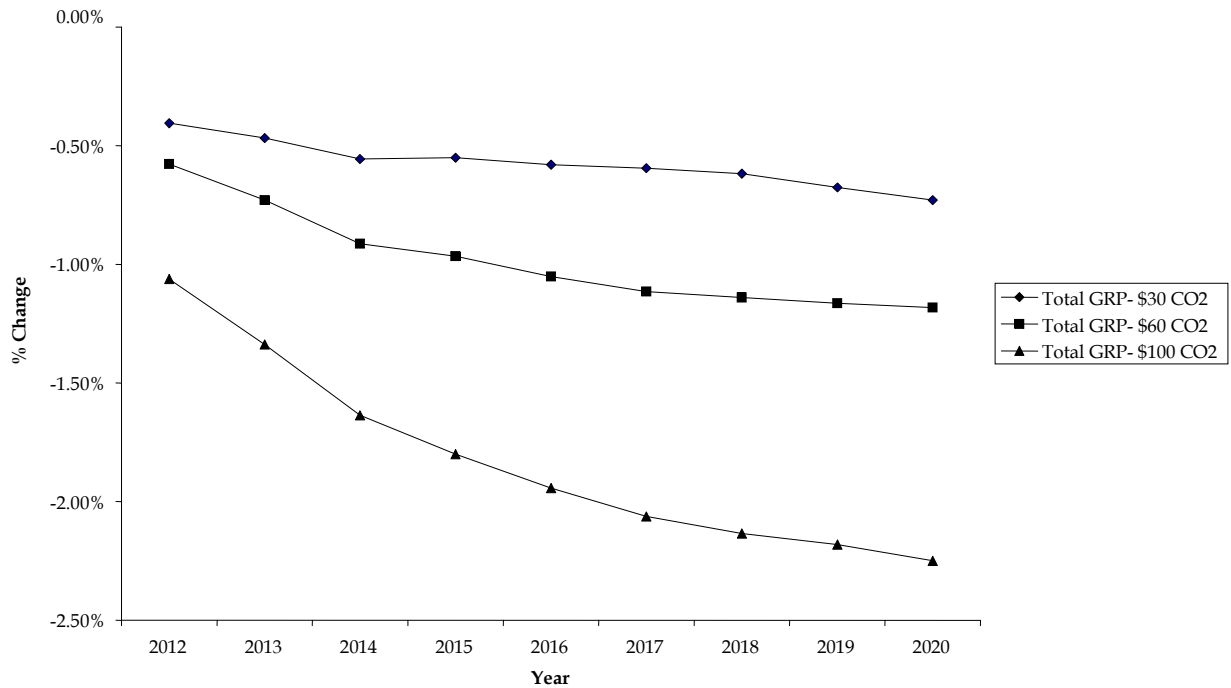
**Figure 2: Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and
Deployment of Renewable Technologies
Gross Regional Product**



**Figure 3: Scenario 3 - 50% of Allowance Revenue Used to Fund State Government General Fund Activities
Gross Regional Product**



**Figure 4: Scenario 4 - 95% of Allowance Revenue Used to Fund State Government General Fund Activities
Gross Regional Product**



5.2 Employment

The percentage declines in total employment due to the imposition of a GHG emission allowance trading program in 2012 would be similar in magnitude to those in GSP - ranging from 0.24 percent to 2.3 percent depending upon the assumptions regarding the price of CO₂ allowances and the distribution of the allowance proceeds (see Figures 5, 6, 7 and 8). In numeric terms, the estimated job losses in 2012 range from 9,000 to 87,000. The REMI modeling results indicate that the magnitude of the negative impacts would grow slightly over time until the end of the study period - reaching from 0.4 percent to 2.8 percent (17,000 to 124,000 jobs) in 2020.

In terms of percent changes, the Construction, Real Estate, Utilities, and Retail sectors would be the hardest hit. In terms of numbers of jobs lost, the Retail, Construction, and Real Estate sectors again would be the biggest losers (see Appendix Tables A13 - A16).

Figure 5: Scenario 1 - No Distribution of Allowance Revenue
Employment

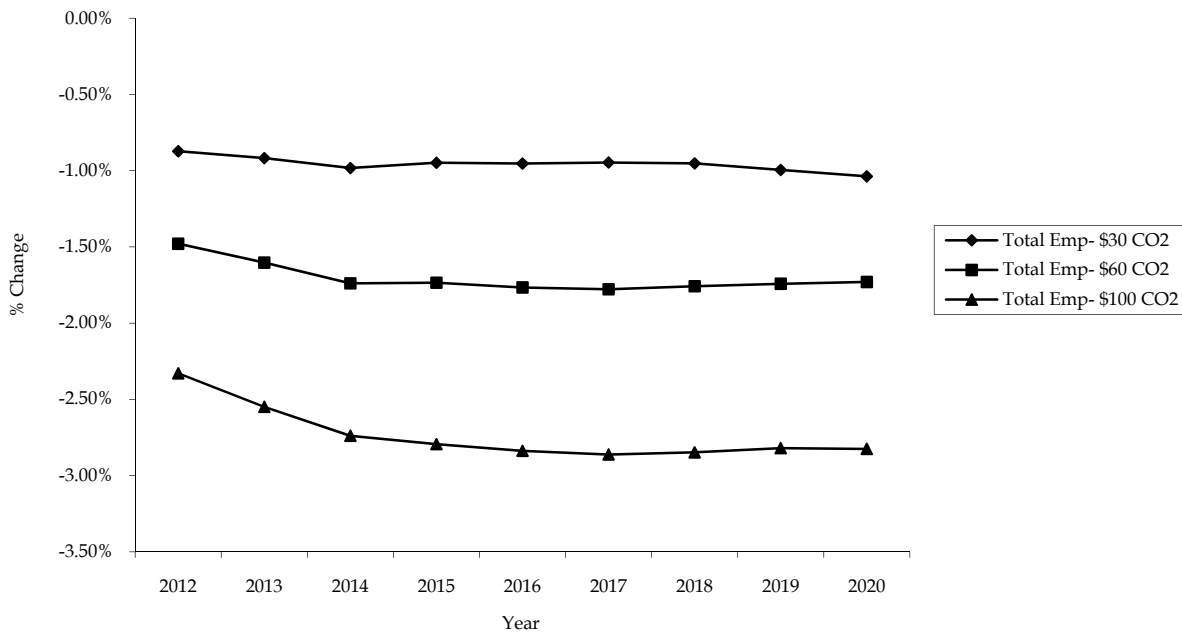


Figure 6: Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and Deployment of Renewable Technologies Employment

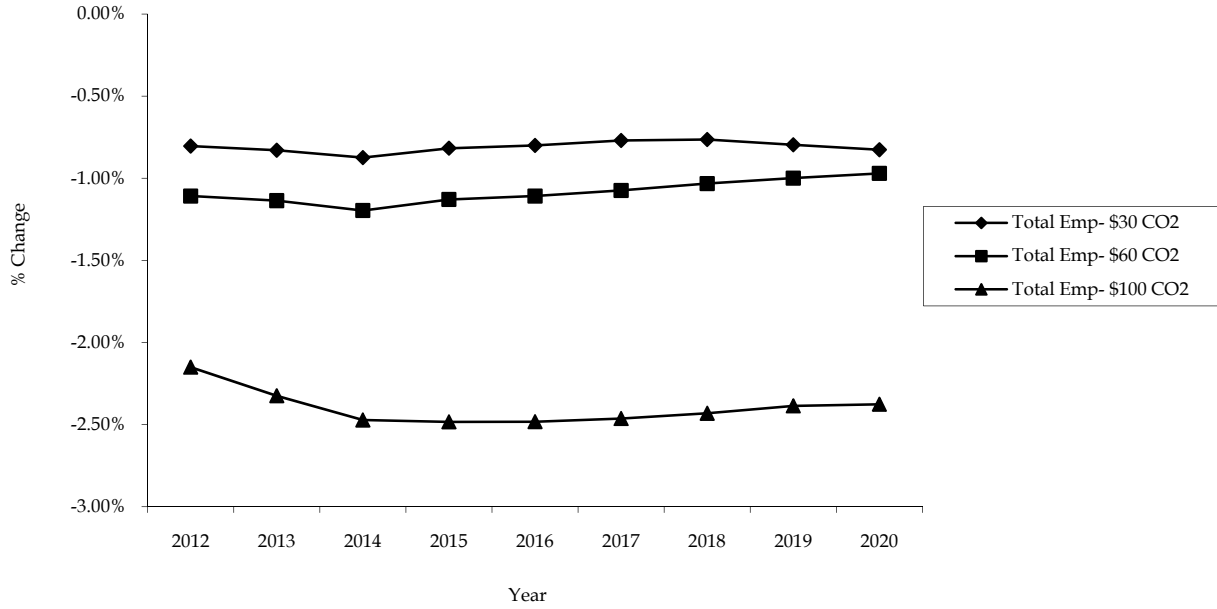


Figure 7: Scenario 3 - 50% of Allowance Revenue Used to Fund State Government General Fund Activities Employment

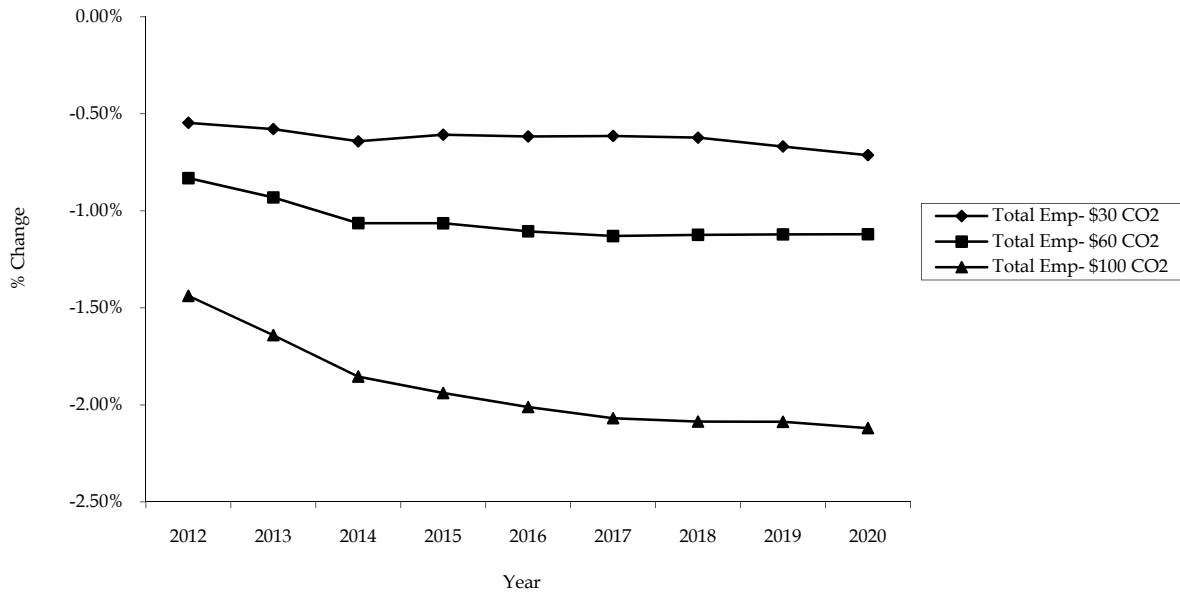
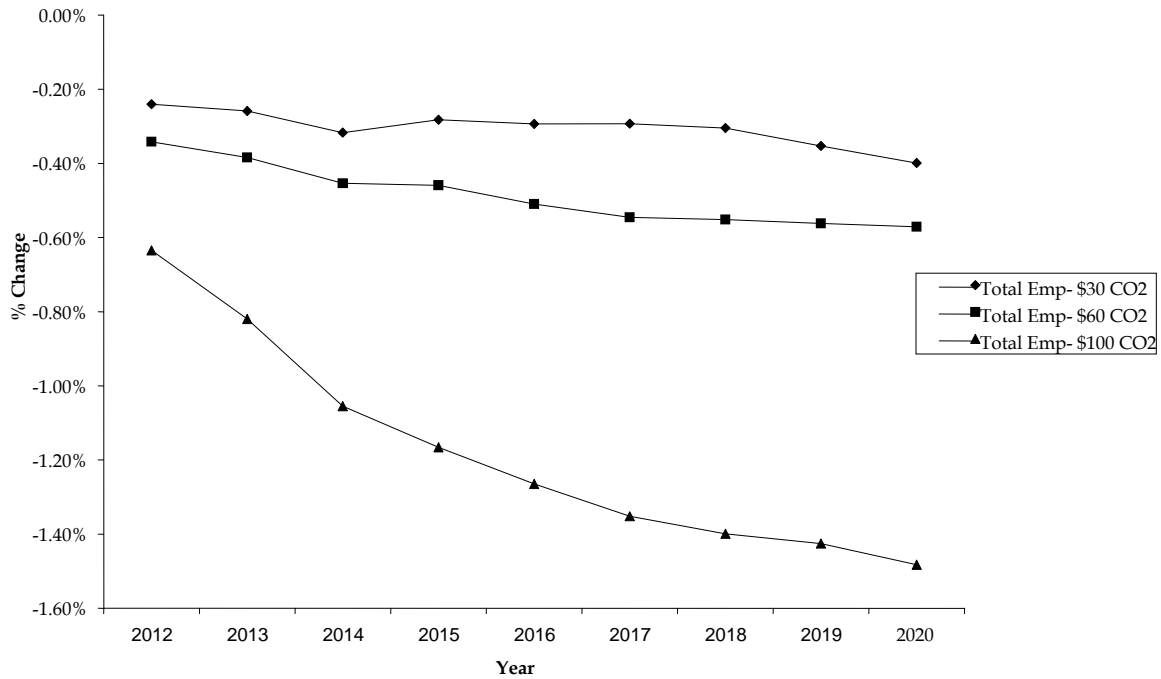


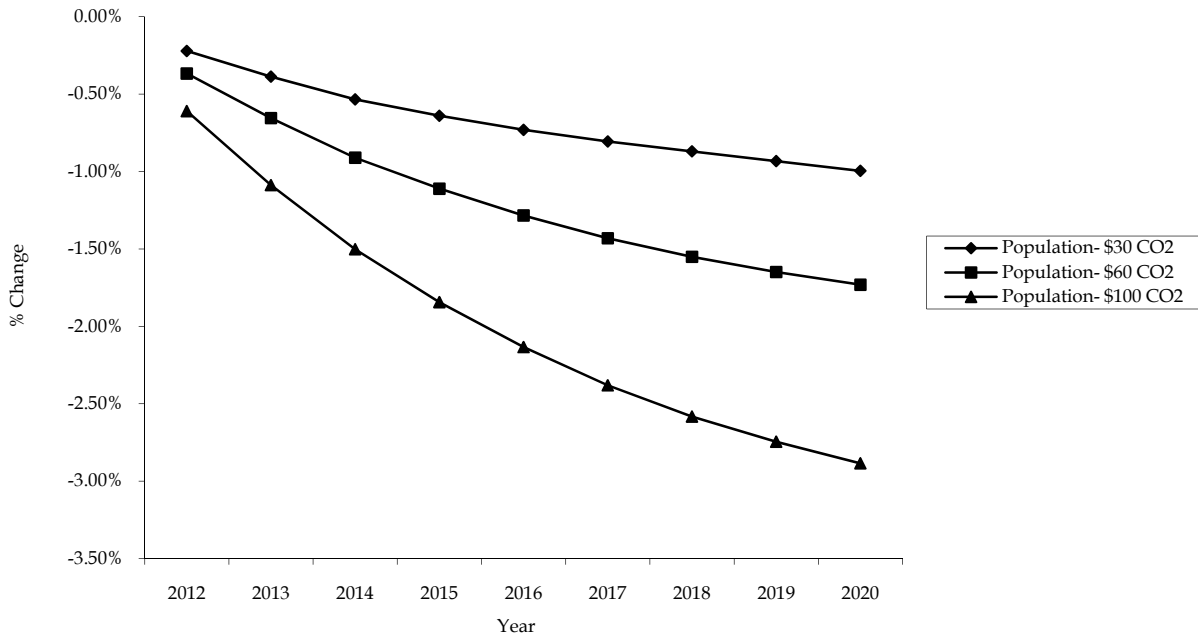
Figure 8: Scenario 4 - 95% of Allowance Revenue Used to Fund State Government General Fund Activities Employment



5.3 Population

The imposition of a GHG emission allowance trading program would also negatively affect Arizona’s population growth. Figures 9 through 12 show the percentage decreases in the state’s population for each year over the 2012–2020 period for each scenario. The declines range from 0.1 percent to 0.6 percent in 2012 (9,000 to 44,000 in numeric terms), and the slowing in population growth would continue over the entire study period so that by 2020, the Arizona population would be 0.5 to 2.9 percent smaller (43,000 to 249,000 individuals).

**Figure 9: Scenario 1 - No Distribution of Allowance Revenue
Population**



**Figure 10: Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and
Deployment of Renewable Technologies
Population**

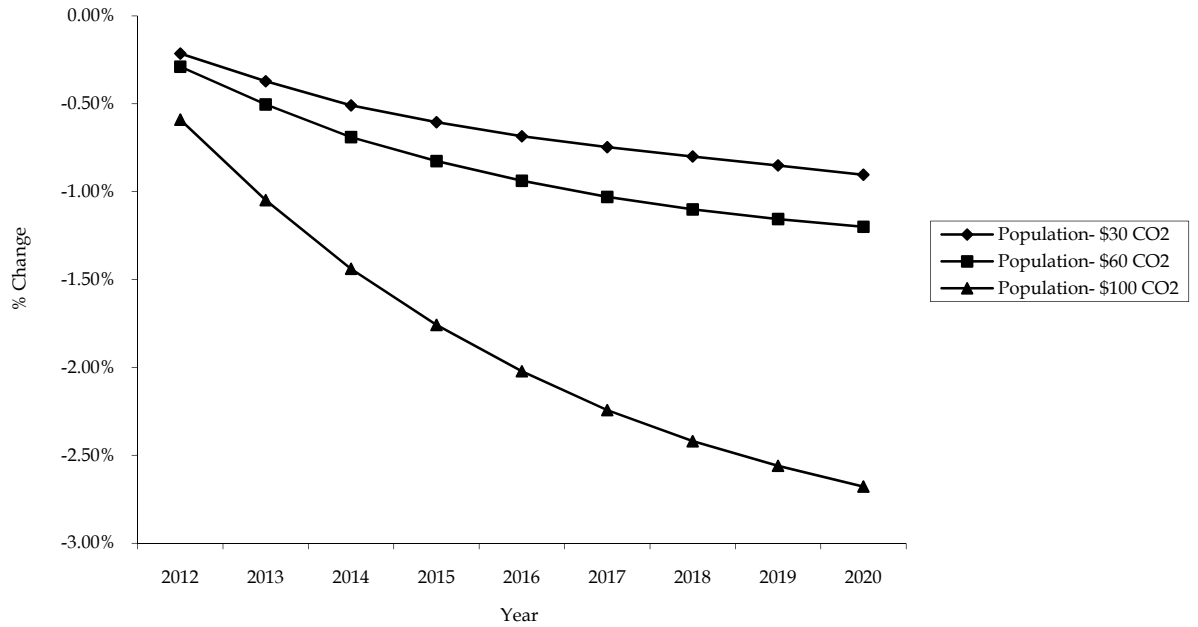


Figure 11: Scenario 3 - 50% of Allowance Revenue Used to Fund State Government General Fund Activities
Population

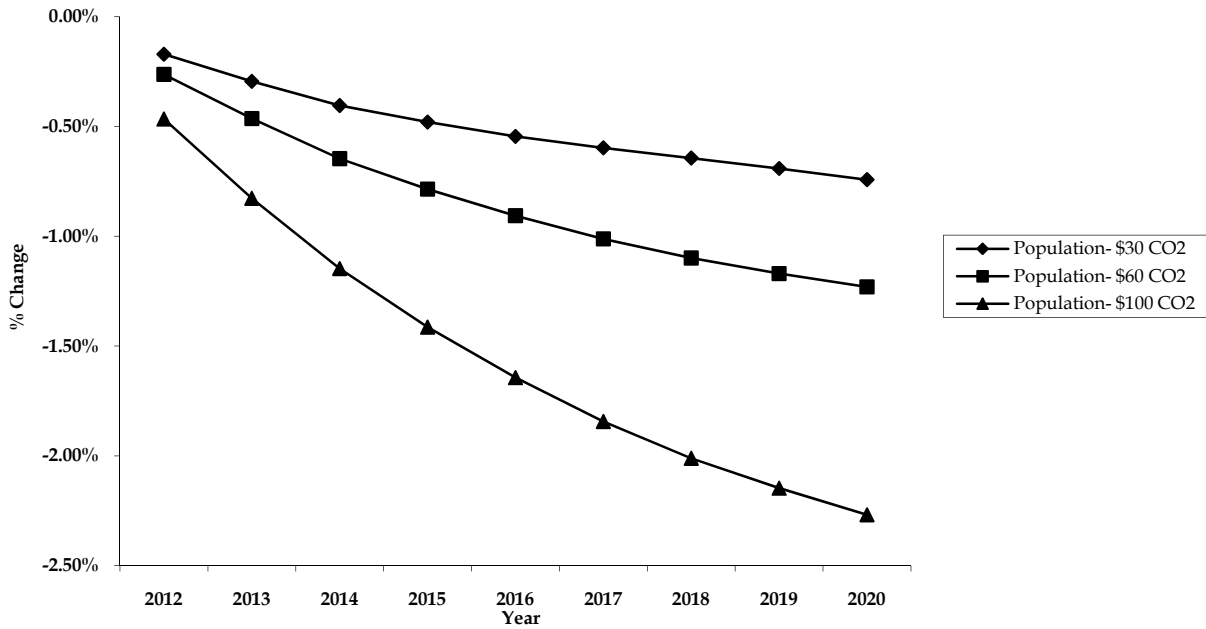
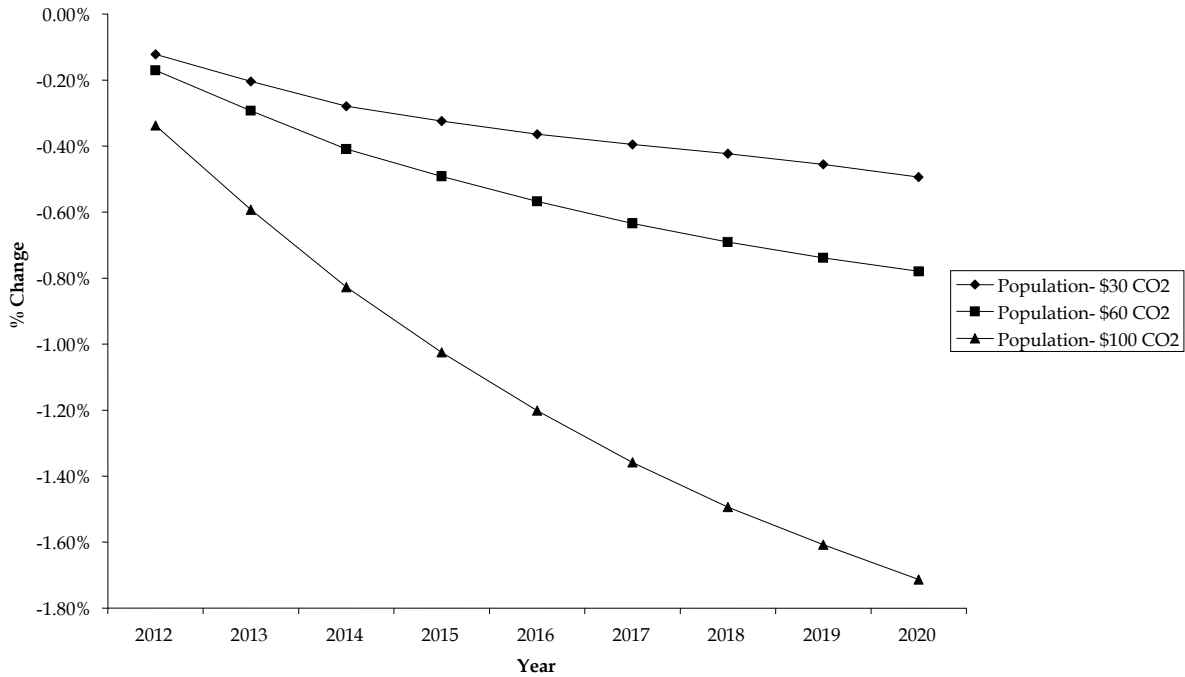


Figure 12: Scenario 4 - 95% of Allowance Revenue Used to Fund State Government General Fund Activities
Population



Most of the slowing in population growth would result from a decline in net migration to the state. Figures 13 through 20 portray the population growth paths and net migration flows for each scenario for the 2012 - 2020 period. The drop in the average annual net migration flow into Arizona would range from 4,000 to 24,000. The population and migration data on which the figures are based are provided in Appendix Tables A29 and A30.

**Figure 13: Population Levels (in Thousands):
Scenario 1- No Distribution of Allowance Revenue
Compared to the Control Scenario**

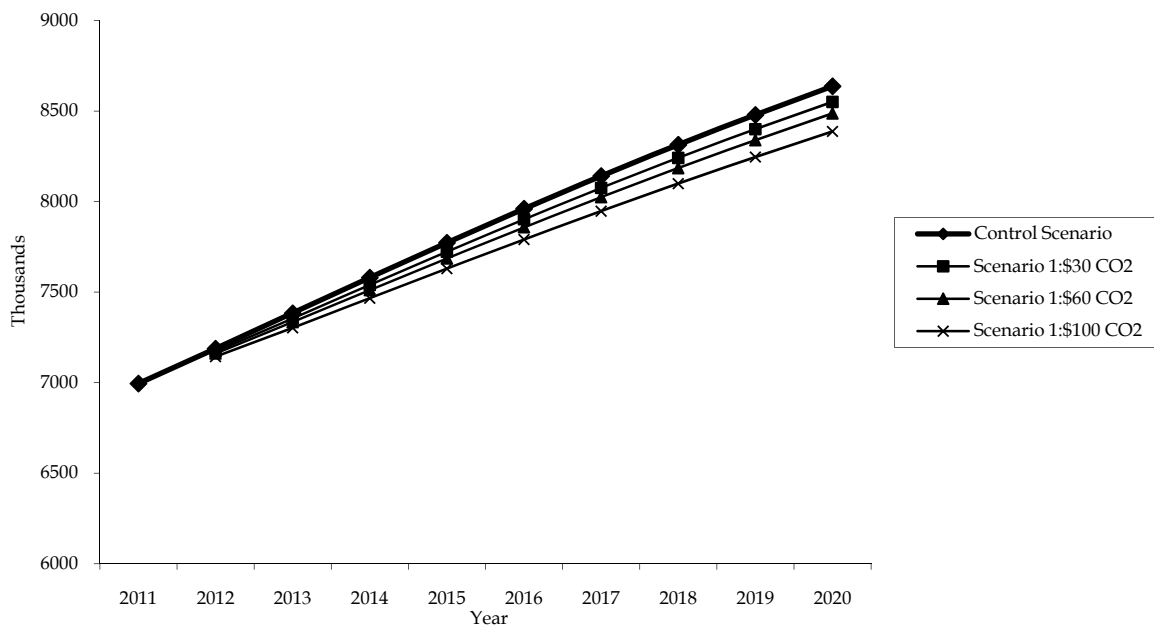


Figure 14: Population Levels (in Thousands)
Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and
Deployment of Renewable Technologies
Compared to the Control Scenario

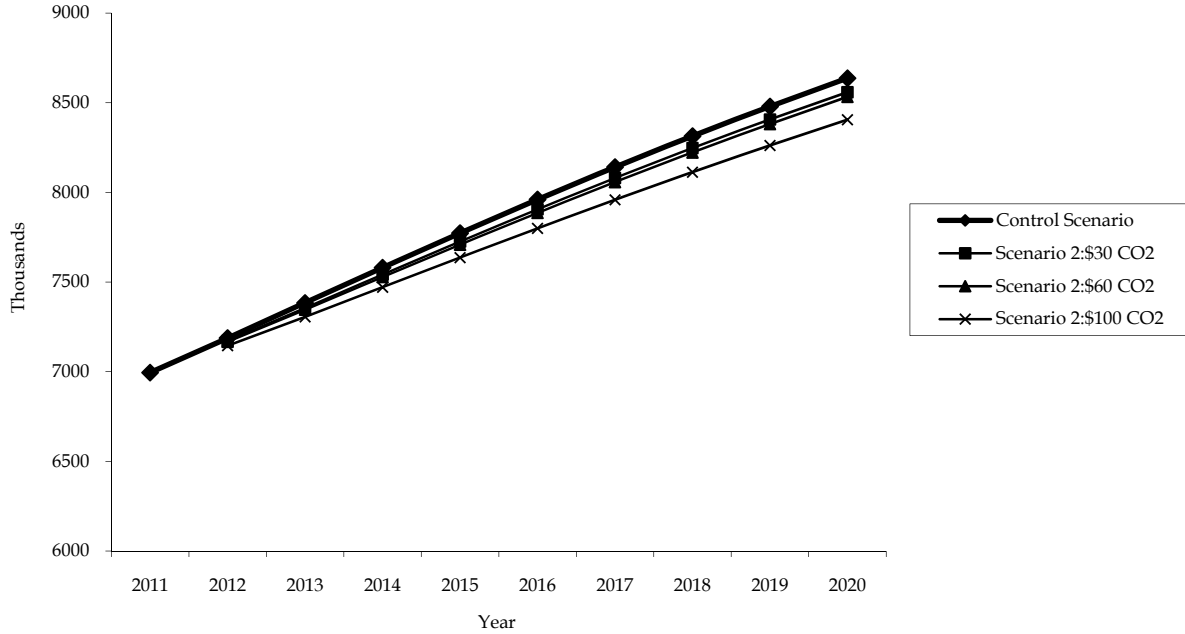


Figure 15: Population Levels (in Thousands)
Scenario 3 - 50% of Allowance Revenue Used to
Fund State Government General Fund Activities
Compared to the Control Scenario

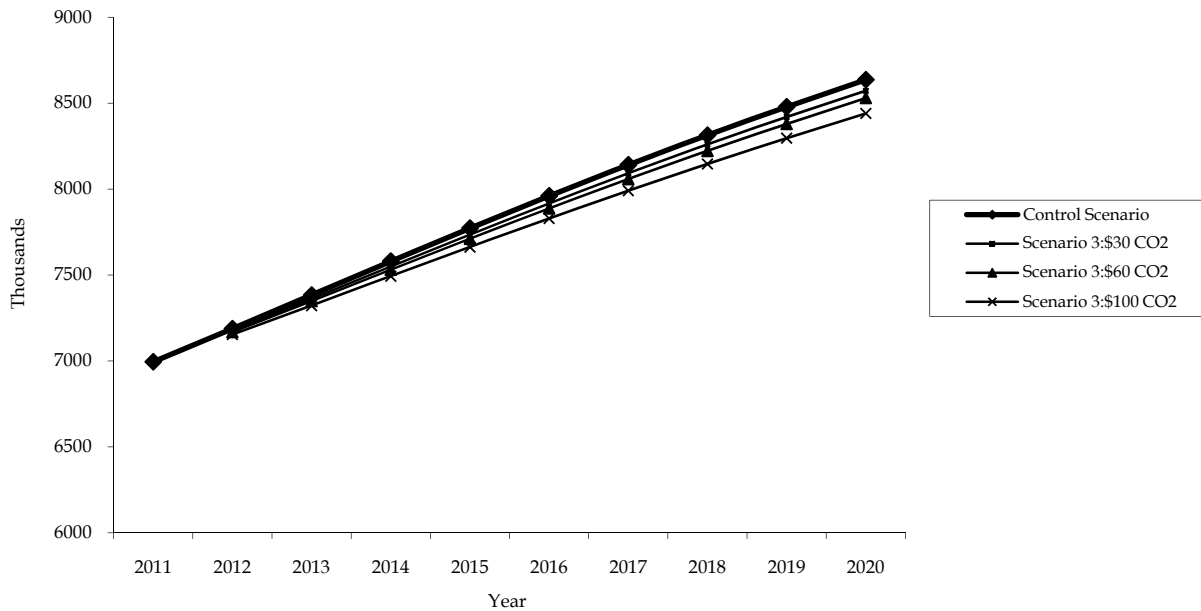


Figure 16: Population Levels (in Thousands): Scenario 4 - 95% of Allowance Revenue Used to Fund State Government General Fund Activities Compared to the Control Scenario

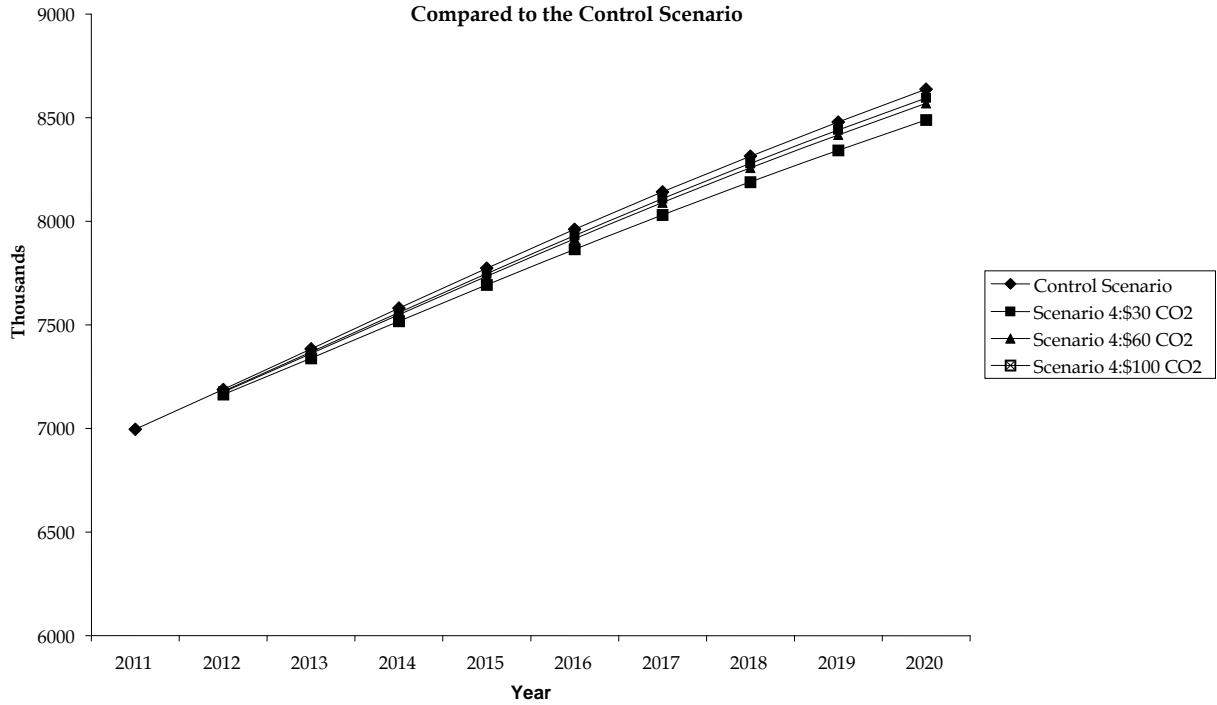


Figure 17: Net Migration (in Thousands) Scenario 1- No Distribution of Allowance Revenue Compared to the Control Scenario

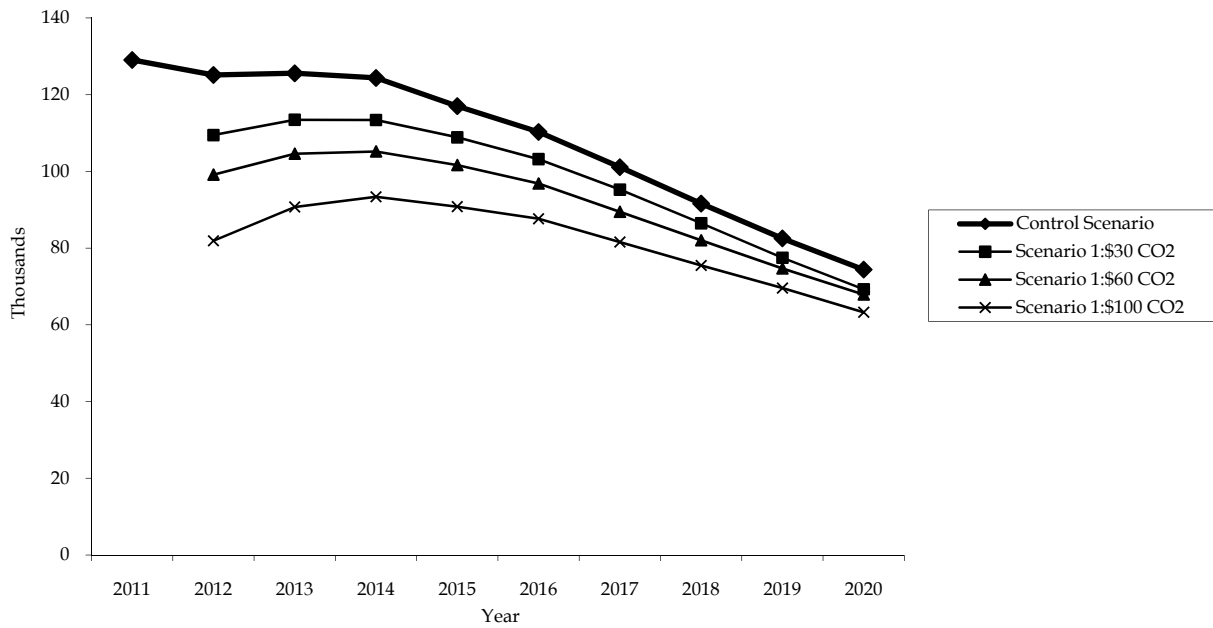


Figure 18: Net Migration (in Thousands)
Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and
Deployment of Renewable Technologies
Compared to the Control Scenario

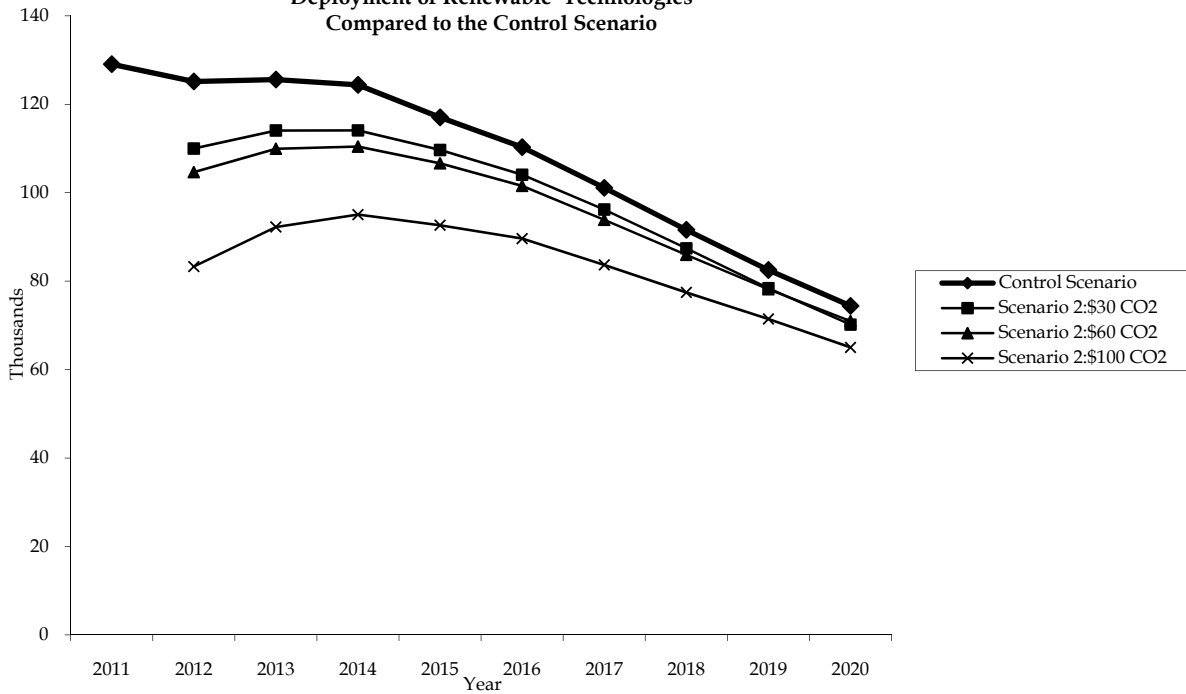


Figure 19: Net Migration (in Thousands)
Scenario 3 - 50% of Allowance Revenue Used to
Fund State Government General Fund Activities
Compared to the Control Scenario

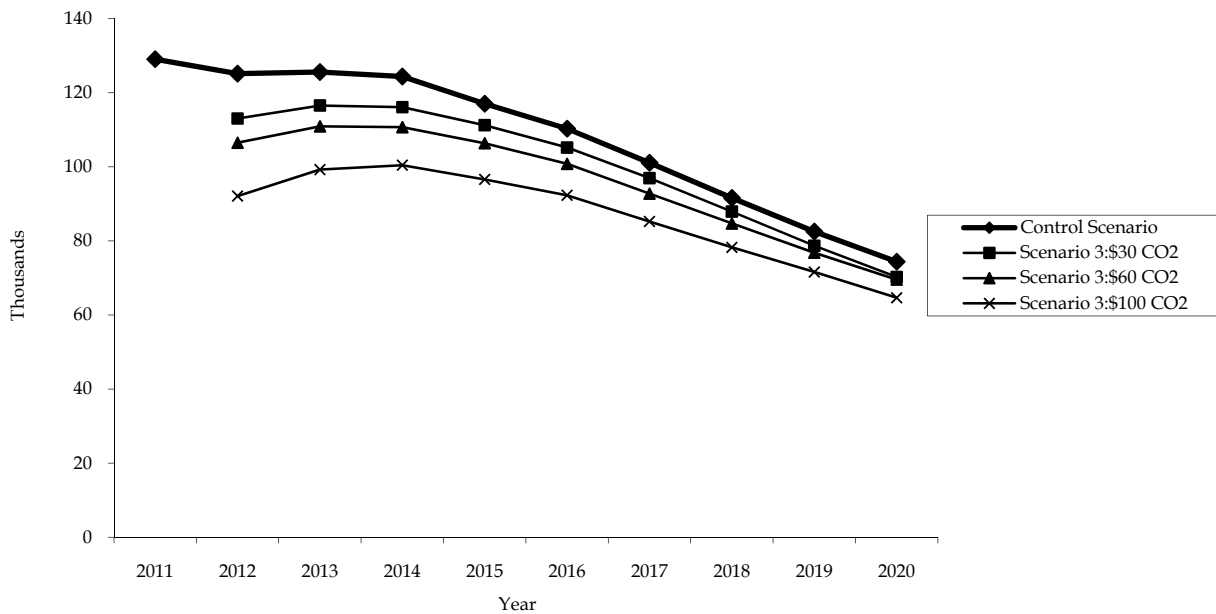
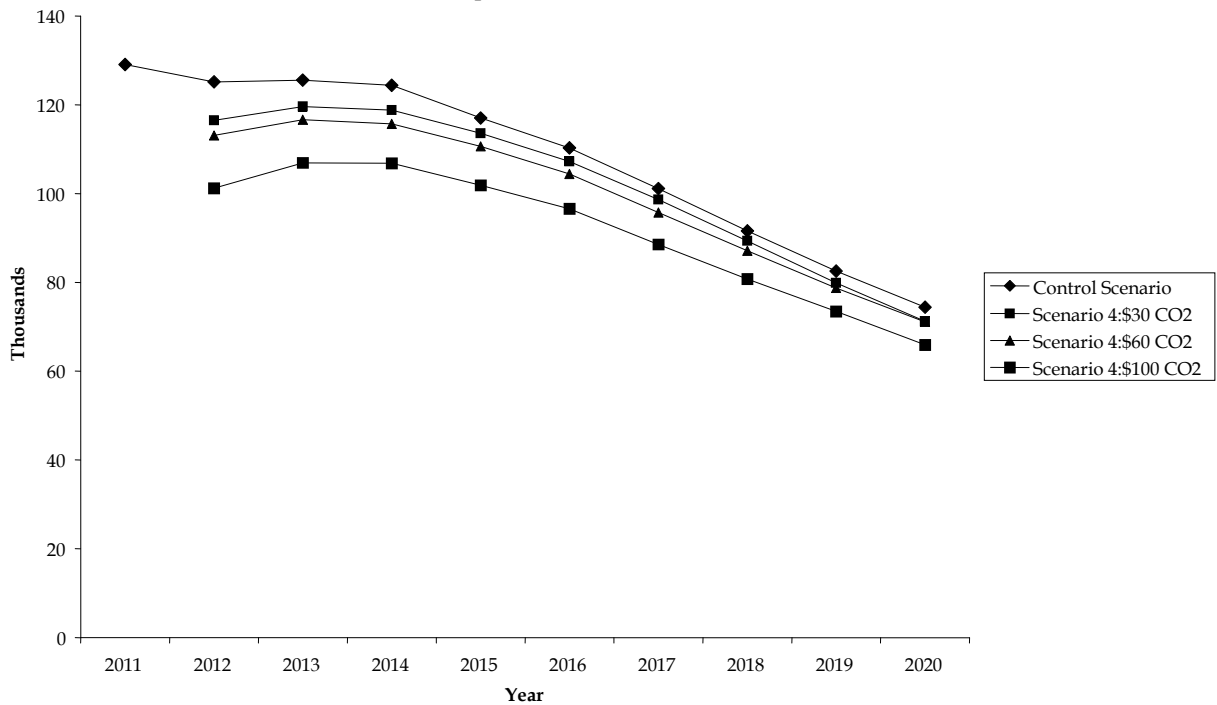


Figure 20: Net Migration (in Thousands): Scenario 4 - 95% of Allowance
 Allowance
 Revenue Used to Fund State Government General Fund Activities
 Compared to the Control Scenario



5.4 Personal Income

Personal income for a region such as the state of Arizona is the sum of all income that is received by Arizona residents. It is calculated as the sum of wage and salary disbursements, supplements to wages and salaries, proprietors' income, rental income of persons, personal dividend income, personal interest income, and personal current transfer receipts, less contributions for government social insurance. While most of Arizona personal income is derived from in-state sources, some portions (such as transfer payments from federal programs like Social Security, interest, and dividends may come from sources outside of the state). These outside sources of income would not be affected by the direct impacts of the GHG emission allowance trading program in the REMI model. Thus, the magnitude of the negative impacts on personal income would be smaller than those on GSP or employment.

The results of the set of REMI simulations imply that the imposition of a GHG emission allowance trading program would reduce Arizona personal income from 0.2 percent to 1.4

percent when implemented in 2012 depending upon the alternative prices of CO₂ allowances and of the distribution of the proceeds from their sale (see Figures 21, 22, 23 and 24). These percent changes represent a loss of from \$0.4 to \$3.7 billion (2009\$). The magnitude of the decline would increase through time, with the estimated impact ranging from 0.4 to 2.2 percent by 2020 - equivalent to \$1.4 billion to \$8.9 billion (2009\$).

**Figure 21: Scenario 1 - No Distribution of Allowance Revenue
Personal Income**

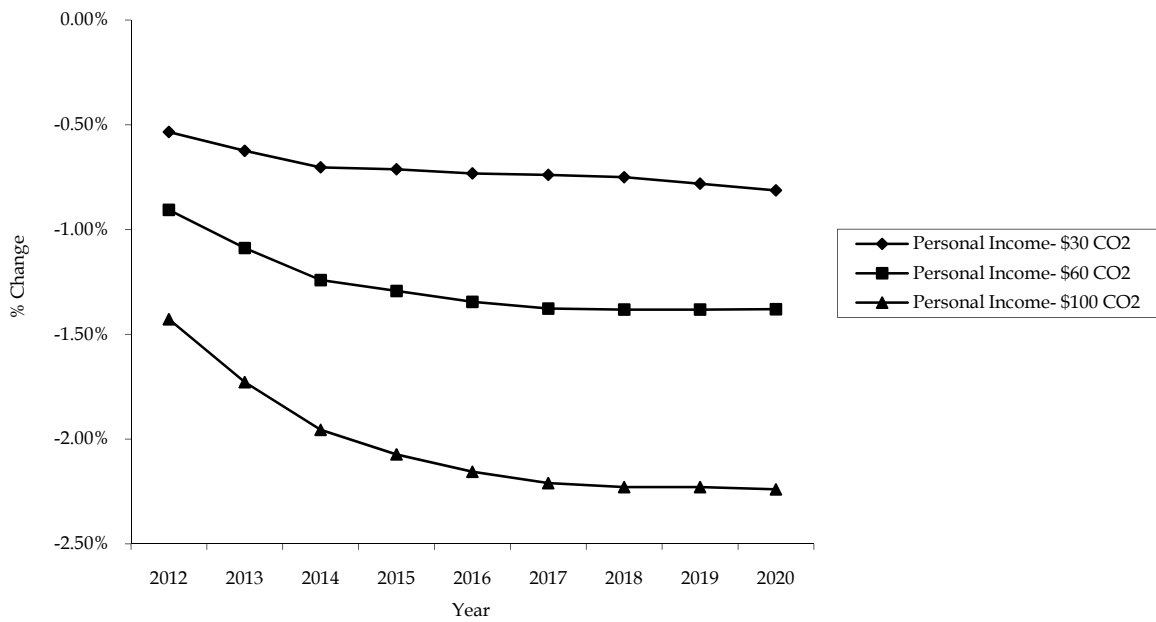


Figure 22: Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and Deployment of Renewable Technologies
Personal Income

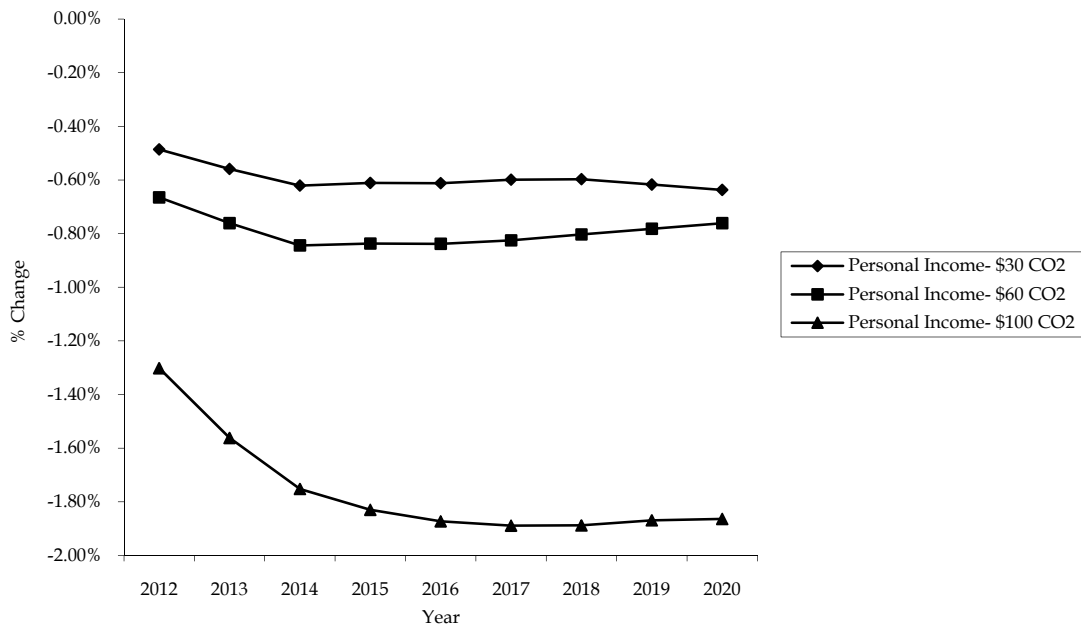


Figure 23: Scenario 3 - 50% of Allowance Revenue Used to Fund State Government General Fund Activities
Personal Income

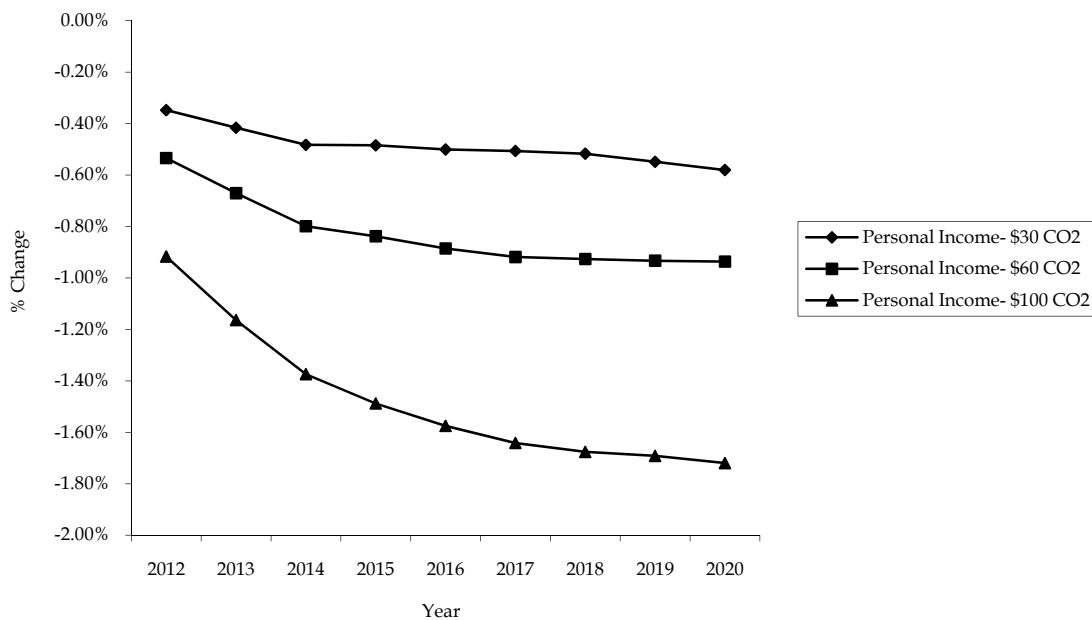
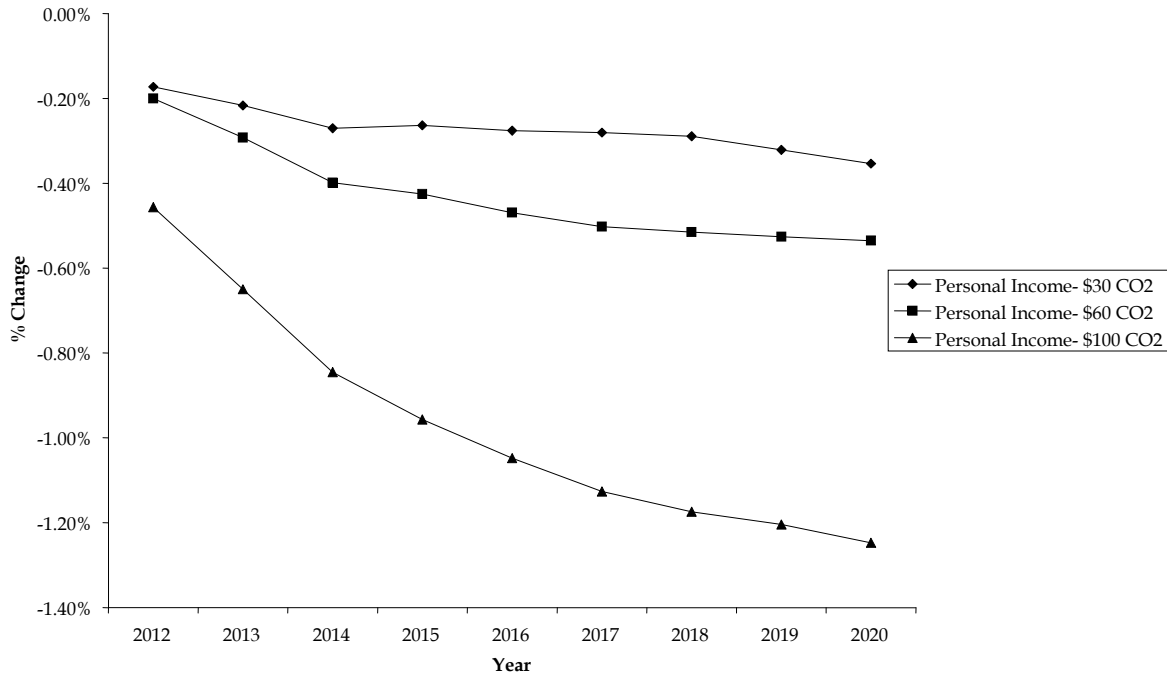


Figure 24: Scenario 4 - 95% of Allowance
 Revenue Used to Fund State Government General Fund Activities
 Personal Income



Looking specifically at the earned income portion of personal income, the percentage declines in total earnings due to the imposition of a GHG emission allowance trading program in 2012 would be larger in magnitude than those in personal income – ranging from 0.25 percent to 2.2 percent depending upon the assumptions regarding the price of CO₂ allowances and the distribution of the allowance proceeds (see Appendix Tables A17 to A20 for the percentage changes in earnings, wages and salaries, and proprietors’ income for each of the four scenarios). In numeric terms, the estimated earnings lost in 2012 range from \$0.5 billion to \$4.2 billion. The REMI results indicate that the magnitude of the negative impacts would increase over time through the end of the study period – reaching 0.4 percent to 2.6 percent (\$0.9 billion to \$6 billion) in 2020. The wage and salary component would be reduced by 0.2 to 2.1 percent in 2012 (\$0.3 billion to \$3 billion), and the magnitude of the loss would grow to 0.4 percent – 2.6 percent by 2020 (\$0.6 - \$4.4 billion). Declines estimated for the proprietors’ income portion – from 0.6 percent to 2.9 percent – imply that the GHG emission allowance trading program would have even stronger negative impacts on small/unincorporated businesses.

Appendix Tables A21 to A24 provide data on the percentage changes in wages and salary disbursements by industry.

5.5 Real Disposable Personal Income Per Capita

Real disposable personal income per capita (RDPIPC) is a proxy measure indicating the average level of income to support the household sector's standard of living measured on a per person basis.¹⁴ The economic impacts of the imposition of a GHG emission allowance trading program would also negatively affect disposable income per person. Figures 25 through 28 show the percentage decreases for each year over the 2012–2020 period for each scenario. The declines range from 1 percent to 4 percent in 2012 - \$290 to \$1,200 (2009\$). Unlike most of the other economic variables considered, the magnitude of the negative impact on RDPIPC would moderate over time primarily as a result of the slowing in population growth. By 2020, the Arizona real disposable personal income per capita would be from 0.4 to 1.4 percent smaller - \$130 to \$440 (2009\$).

¹⁴ Disposable personal income is defined as personal income minus personal taxes. It is converted to per capita terms by dividing by total population, and adjusted to real terms using the PCE (personal consumption expenditures) price index.

Figure 25: Scenario 1 - No Distribution of Allowance Revenue
Real Disposable Personal Income per Capita

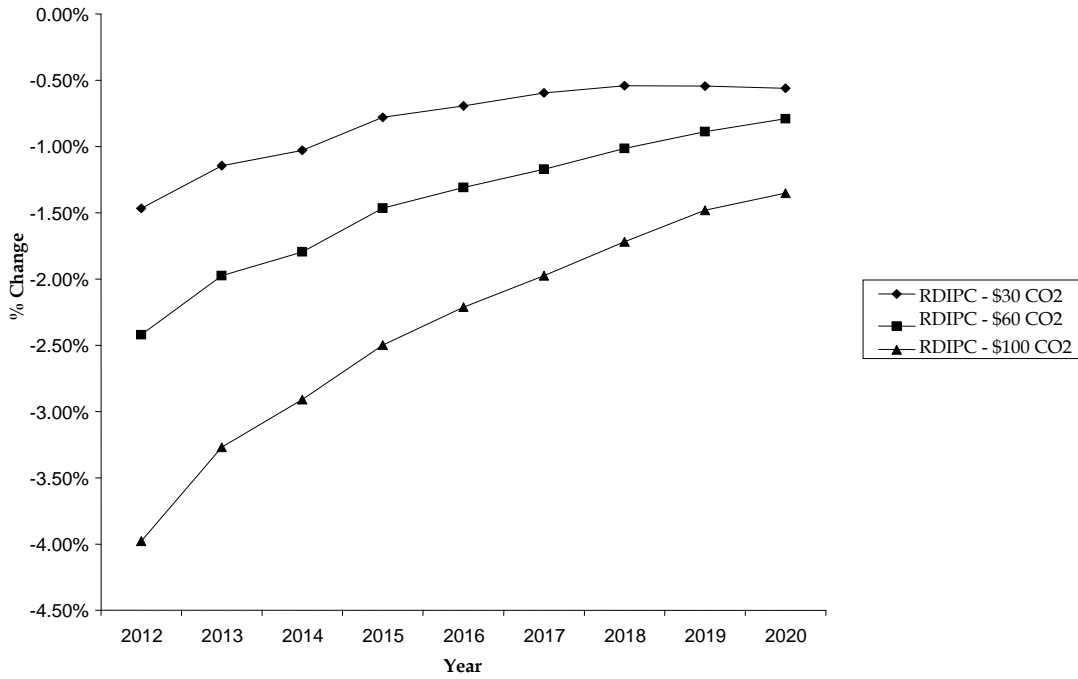
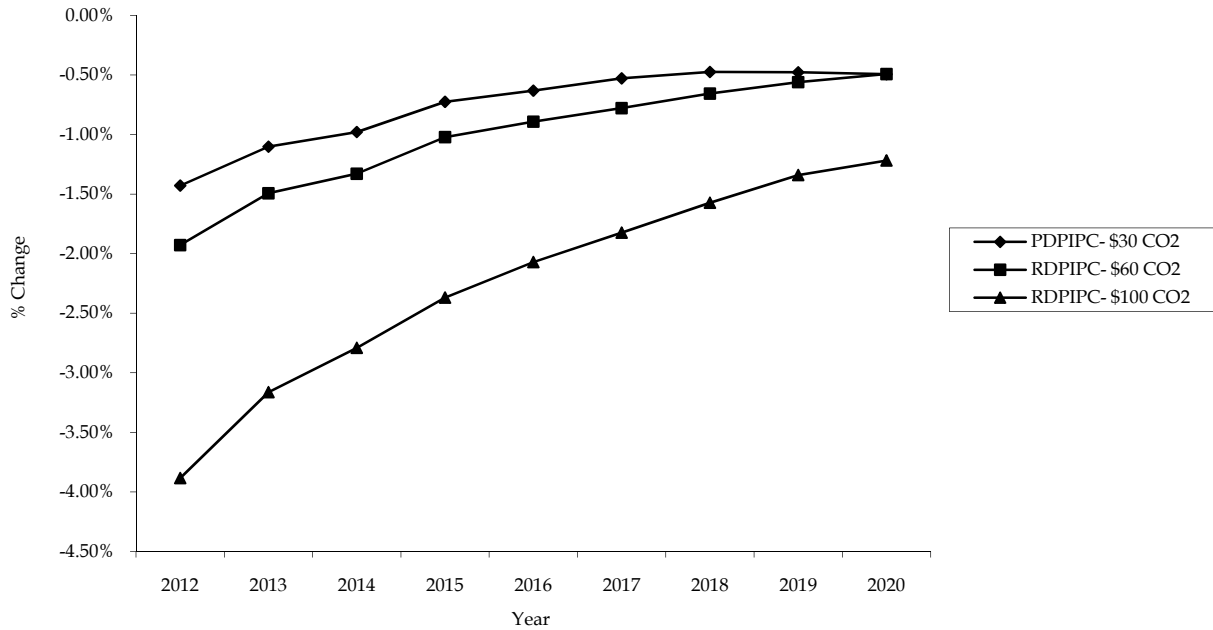
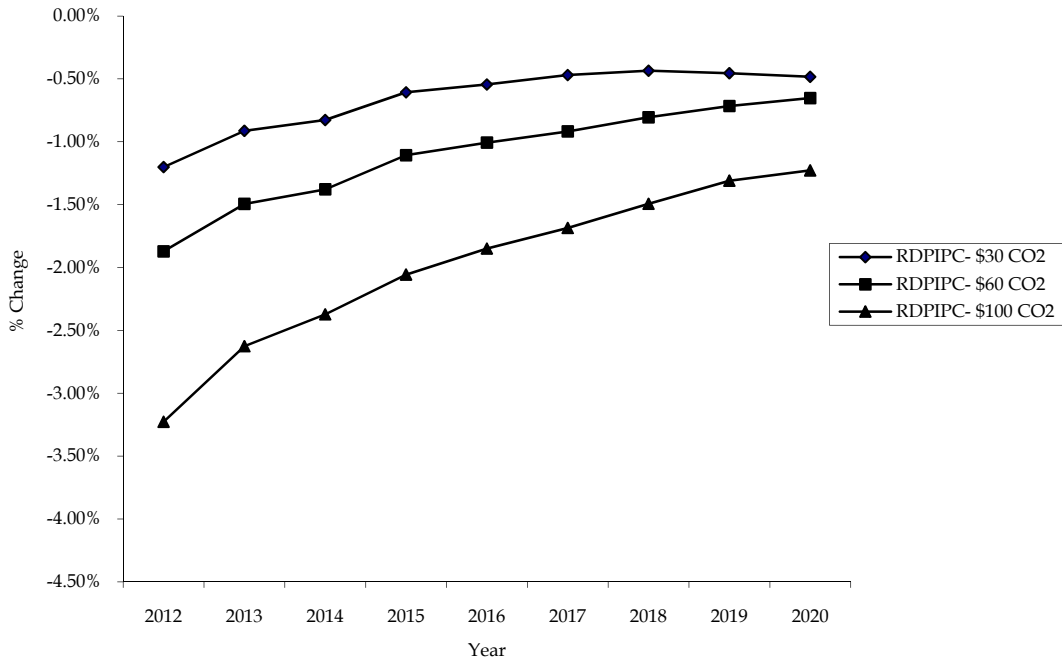


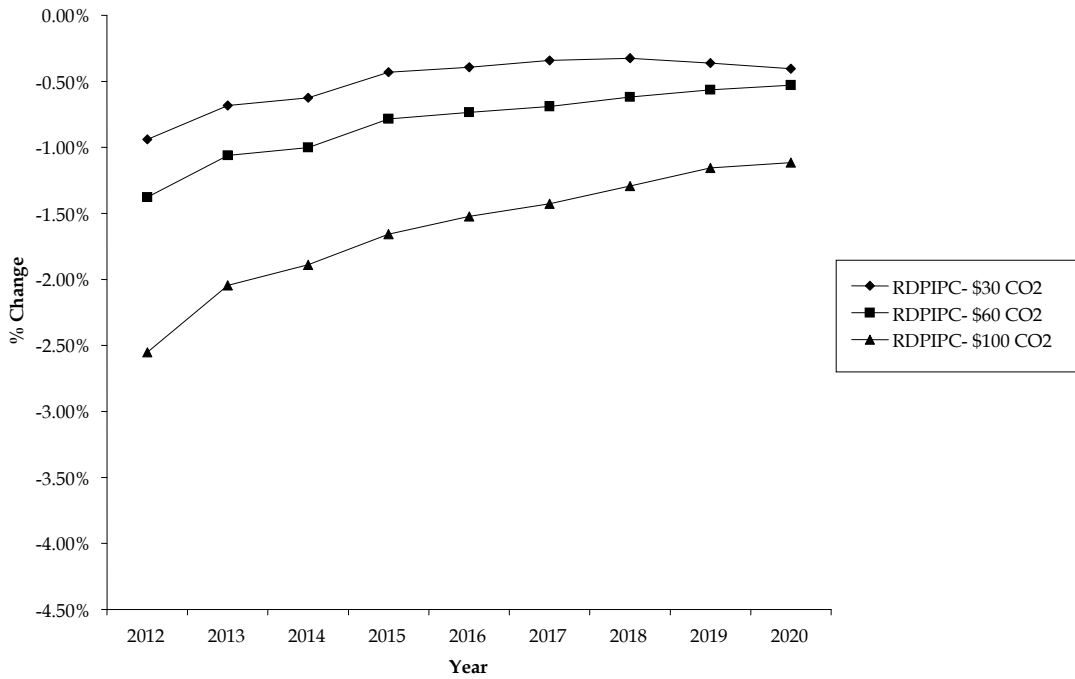
Figure 26: Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and
Deployment of Renewable Technologies
Real Disposable Personal Income per Capita



**Figure 27: Scenario 3 - 50% of Allowance Revenue Used to Fund State Government General Fund Activities
Real Disposable Personal Income per Capita**



**Figure 28: Scenario 4 - 95% of Allowance Revenue Used to Fund State Government General Fund Activities
Real Disposable Personal Income per Capita**



5.6 Retail Sales

The REMI model does not provide values of retail sales as that economic series is typically measured and reported for Arizona. The available substitute is a measure of the dollar value of the output of the Retail sector. As already identified by the results for GSP and employment, the proxy measure indicates that implementation of the WCI cap and trade system would have significant negative impacts on retail sales. Figures 29 through 32 depict the percentage decreases for each year over the 2012–2020 period for each scenario. The declines range from 0.7 percent to 3.4 percent in 2012 (\$0.3 billion to \$1.25 billion). The REMI results indicate that the negative impacts would grow slightly until the end of the study period – reaching from 0.8 percent to 3.9 percent (\$0.5 billion to \$2.1 billion) in 2020.

Figure 29: Scenario 1 - No Distribution of Allowance Revenue
Retail Trade

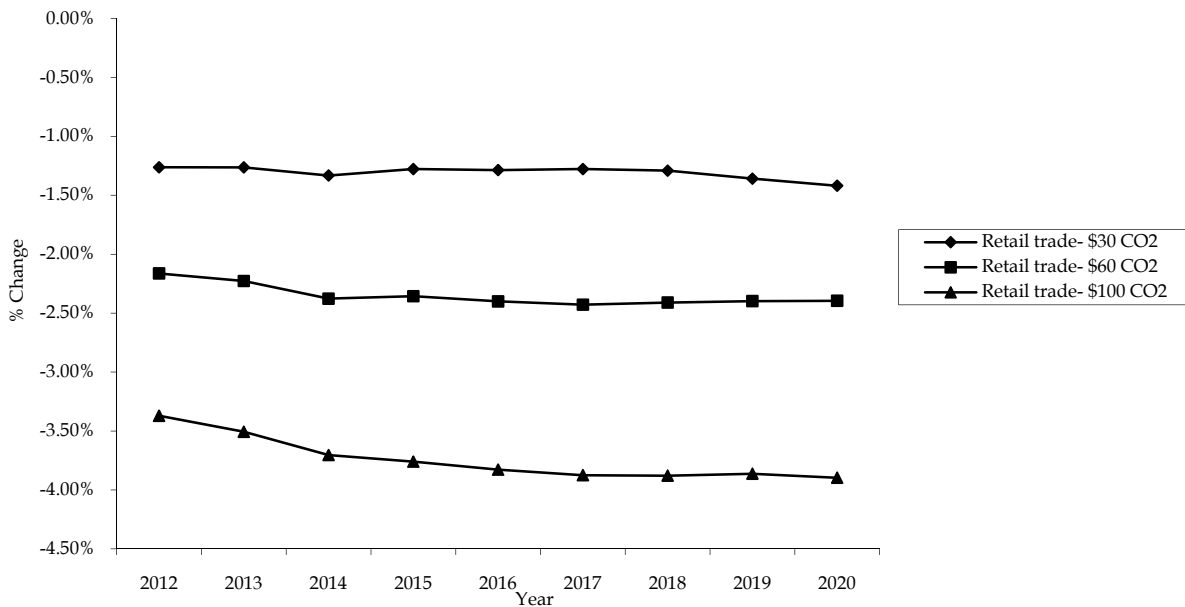


Figure 30: Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and Deployment of Renewable Technologies
Retail Trade

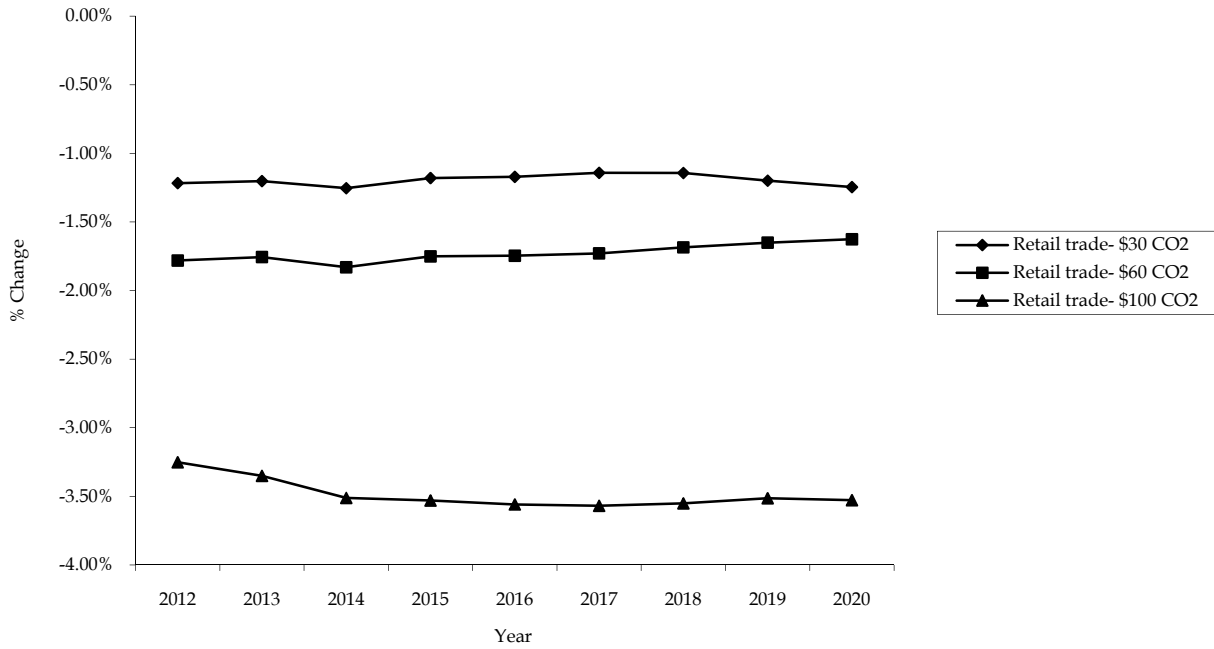


Figure 31: Scenario 3 - 50% of Allowance Revenue Used to Fund State Government General Fund Activities
Retail Trade

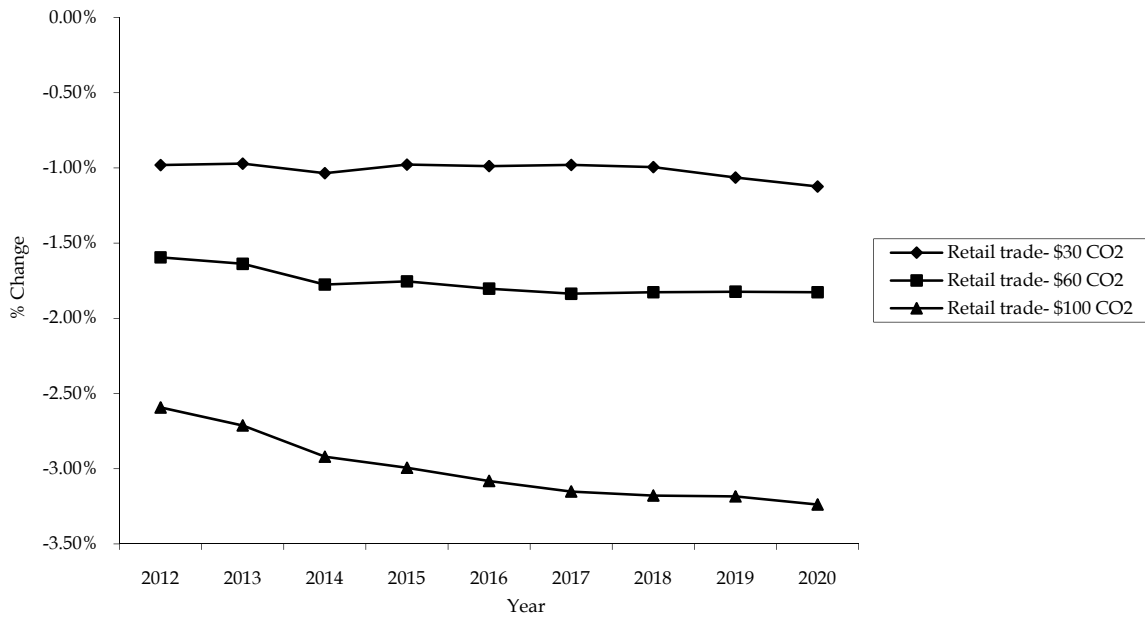
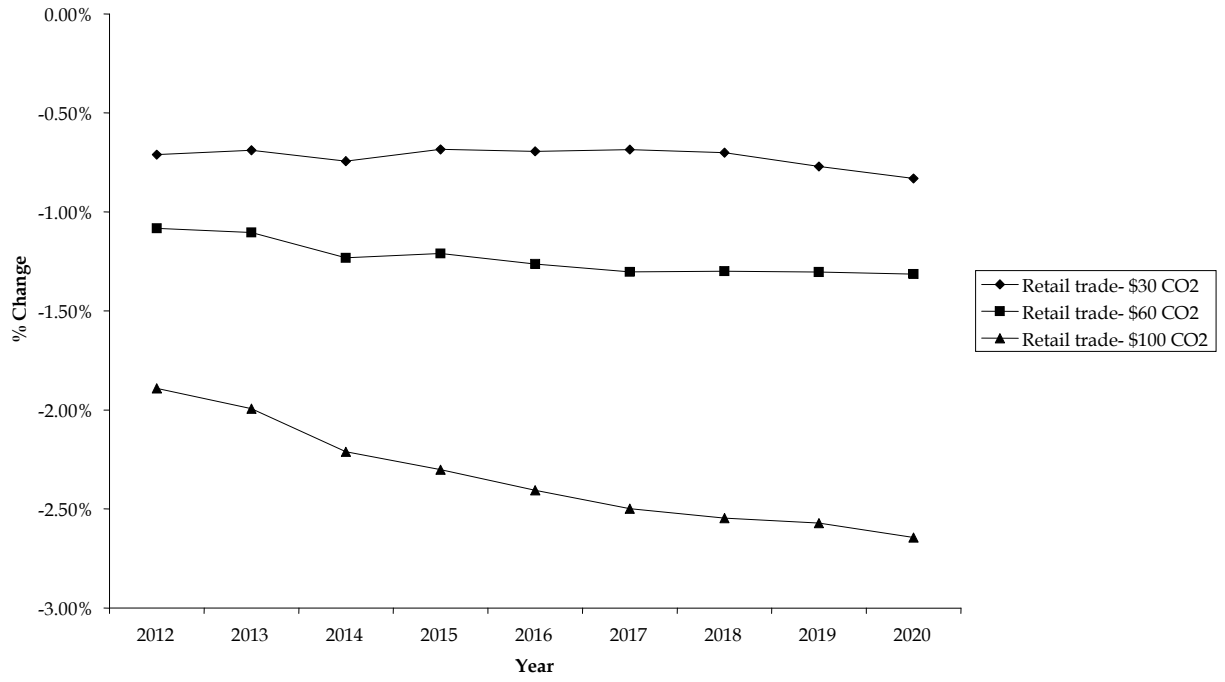
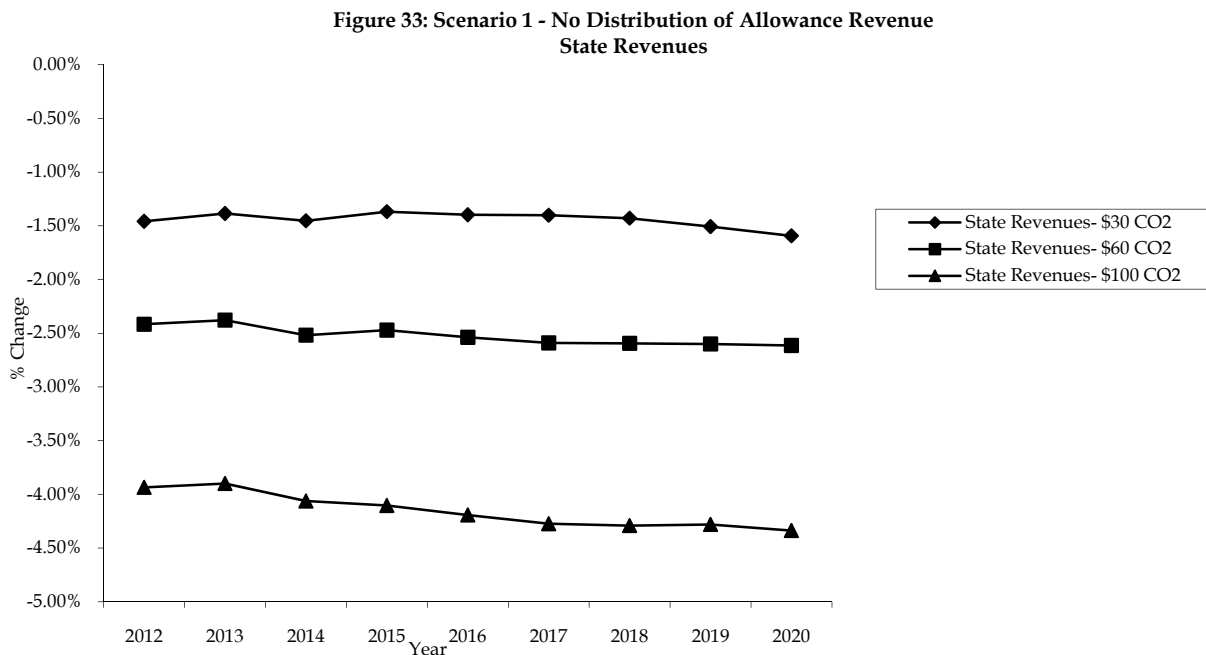


Figure 32: Scenario 4 - 95% of Allowance
Revenue Used to Fund State Government General Fund Activities
Retail Trade

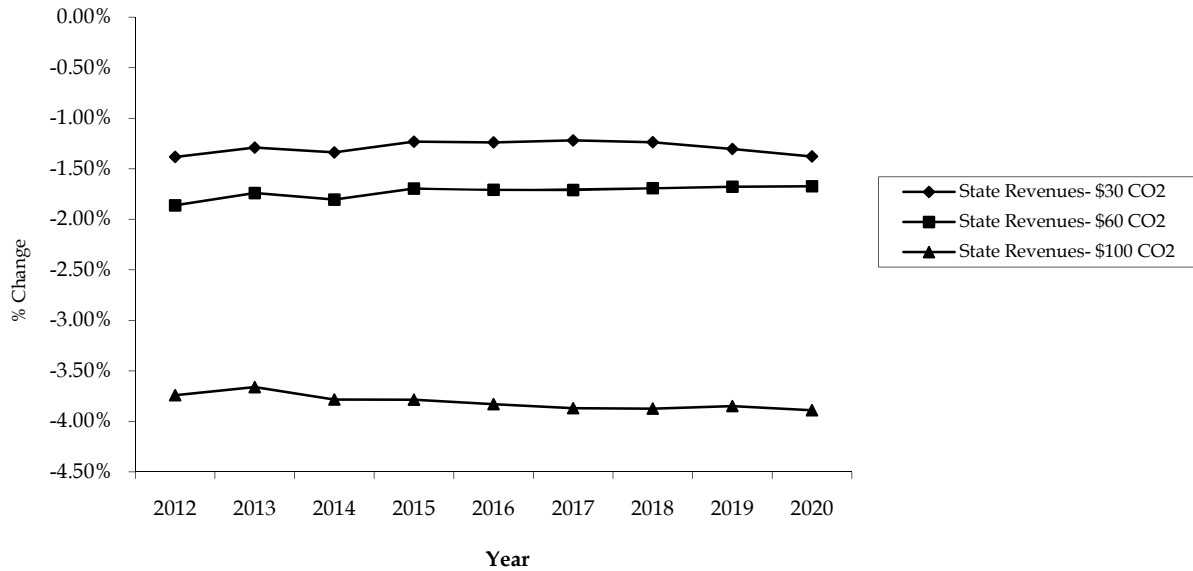


5.7 State Government Revenues

Since both the business and household sectors would feel negative economic impacts, the imposition of a GHG emission allowance trading program is also going to affect state government revenues. The REMI results indicate state revenues would range from 0.55 percent higher to 4 percent lower in 2012. These percent changes represent a gain of \$0.2 billion to a loss of \$1.37 billion. These figures would worsen through time, to 0.2 percent higher to 4.34% lower in 2020 -equivalent to a gain of \$0.078 billion to a loss of \$1.92 billion by 2020. (see Figures 33 to 36).



**Figure 34: Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and Deployment of Renewable Technologies
State Revenues**



**Figure 35: Scenario 3 - 50% of Allowance Revenue Used to Fund State Government General Fund Activities
State Revenues**

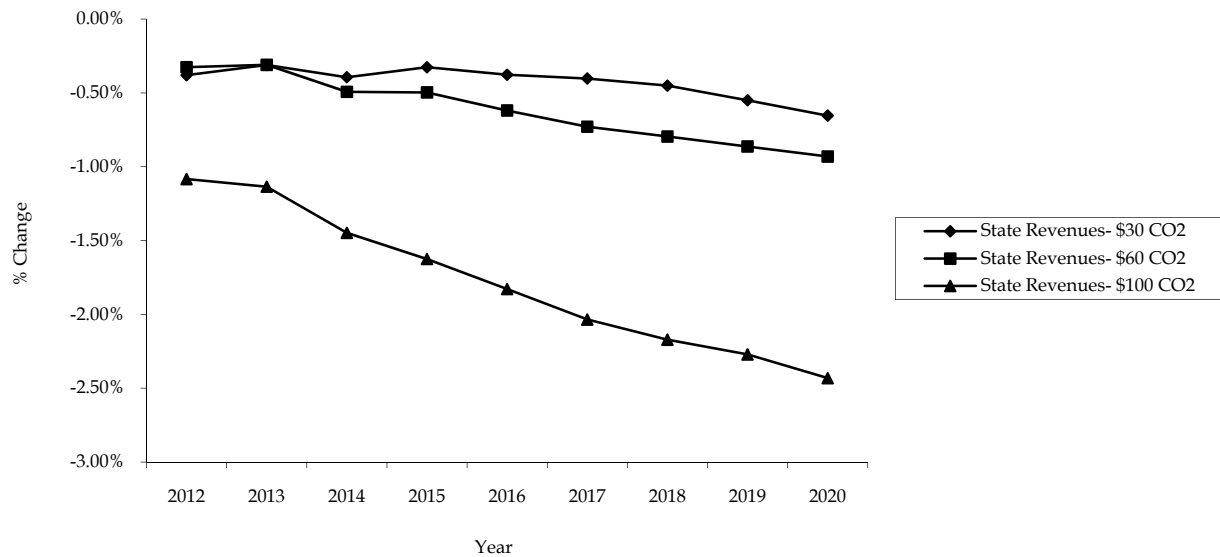
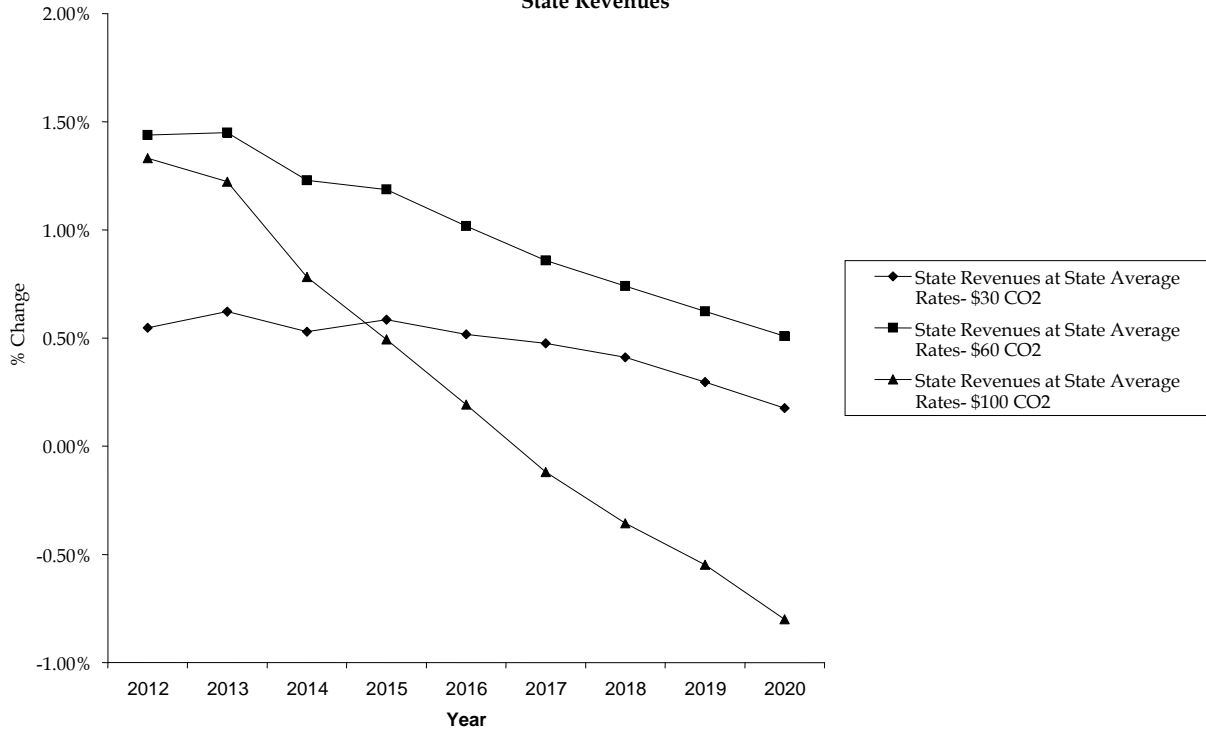


Figure 36: Scenario 4 - 95% of Allowance
Revenue Used to Fund State Government General Fund Activities
State Revenues



Appendix Tables A25 to A28 show the percentage changes in the 12 components of state revenues reported in the REMI model results for each of the four scenarios.

5.8 Personal Consumption Expenditures Price Index

The personal consumption expenditures price index provides a measure of changes in the prices paid for the market basket of goods and services purchased by Arizona households. Based on the results of the set of REMI simulations, the imposition of a GHG emission allowance trading program would result in a jump in the PCE index of from 1.2 percent to 3.3 percent when implemented in 2012 depending upon the alternative prices of CO₂ allowances and of the distribution of the proceeds from their sale (see Figures 37, 38, 39 and 40). The magnitude of the inflationary impact would moderate over time as households conserved in their use of more expensive energy and shifted consumption away from more expensive goods

and services. By 2020, the Arizona PCE index would remain from 0.8 percent to 2.1 percent higher as a result of the WCI system.

The table below summarizes the economic impact (percentage and level terms) under the best case outcome and worse case outcome, relative to the baseline (no WCI).

Table 1: Economic Impact under best case and worse case outcome relative to baseline (no WCI)

	Best-case outcome: 95% recycling with an allowance price of \$30		Worse-case outcome: zero recycling with an allowance price of \$100	
	2012	2020	2012	2020
Gross State Product	-0.41% (-\$1.33 billion)	-0.73% (-\$3.31 billion)	-2.3% (-\$7.56 billion)	-3.2% (-\$14.7 billion)
Total Employment	-0.24% (-9,000)	-0.40% (-17,000)	-2.3% (-87,000)	-2.8% (-124,000)
State Revenues¹⁵	0.55% (\$0.2 billion)	0.18% (\$0.08 billion)	-4% (\$1.37 billion)	-4.34% (\$1.92 billion)
Retail Trade	-0.71% (-\$0.3 billion)	-0.83% (-\$0.5 billion)	-3.4% (-\$1.25 billion)	-3.9% (-\$2.1 billion)
Real Disposable Personal Income per Capita	-0.94% (-\$290)	-0.40% (-\$130)	-4% (-\$1200)	-1.4% (-\$440)
Population	-0.12% (-9,000)	-0.49% (-43,000)	-0.6% (-44,000)	-2.9% (-249,000)
Personal Income	-0.17% (-\$0.4 billion)	-0.35% (-\$1.4 billion)	-1.4% (-\$3.7 billion)	-2.2% (-\$8.9 billion)
PCE Price Index	1.22%	0.80%	3.3%	2.1%

¹⁵ At average rates.

Figure 37 Scenario 1 - No Distribution of Allowance Revenue
PCE- Price Index

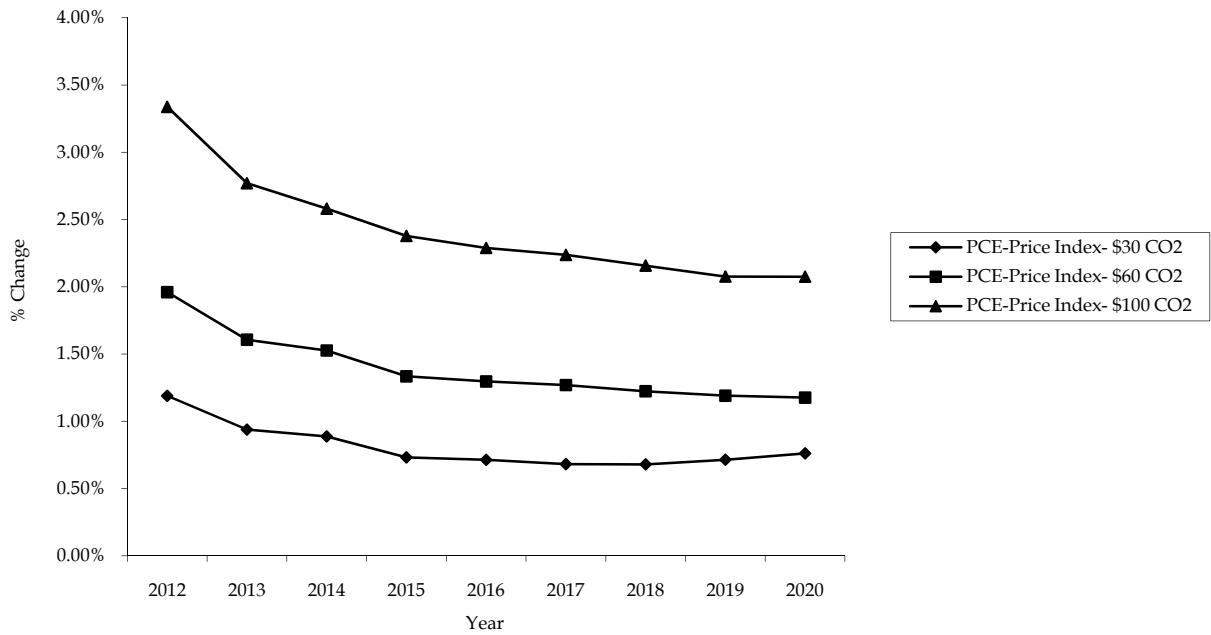
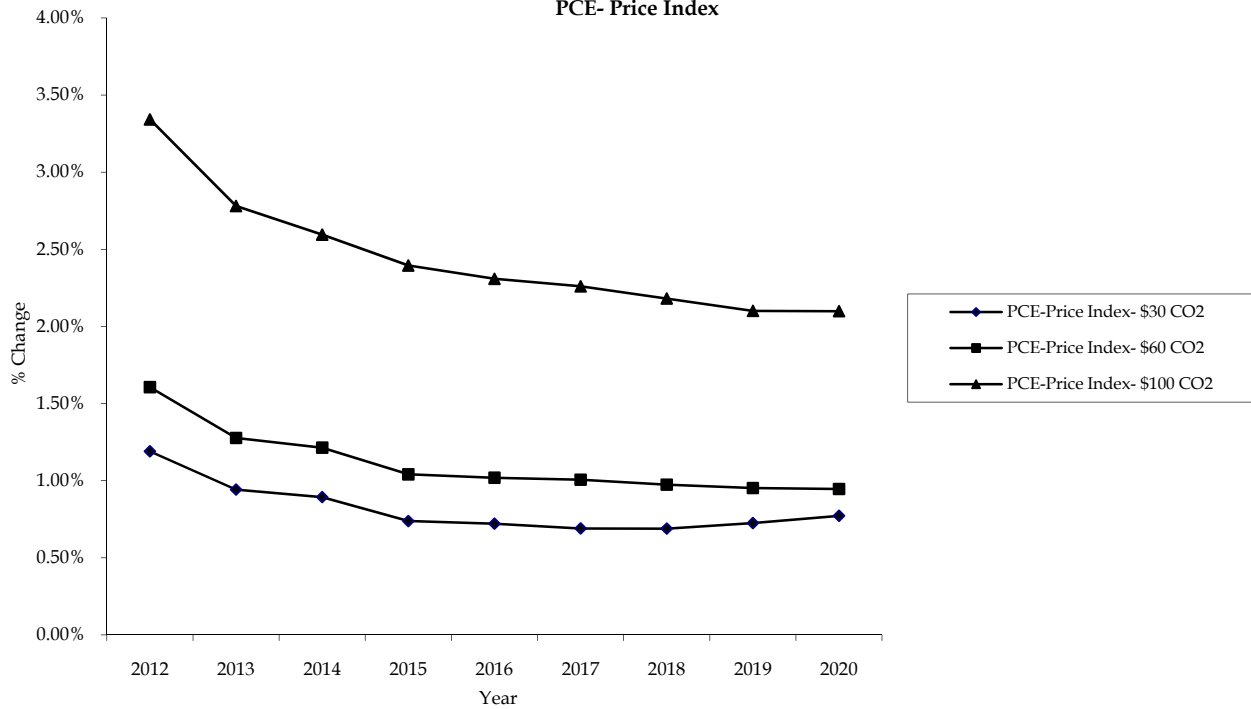
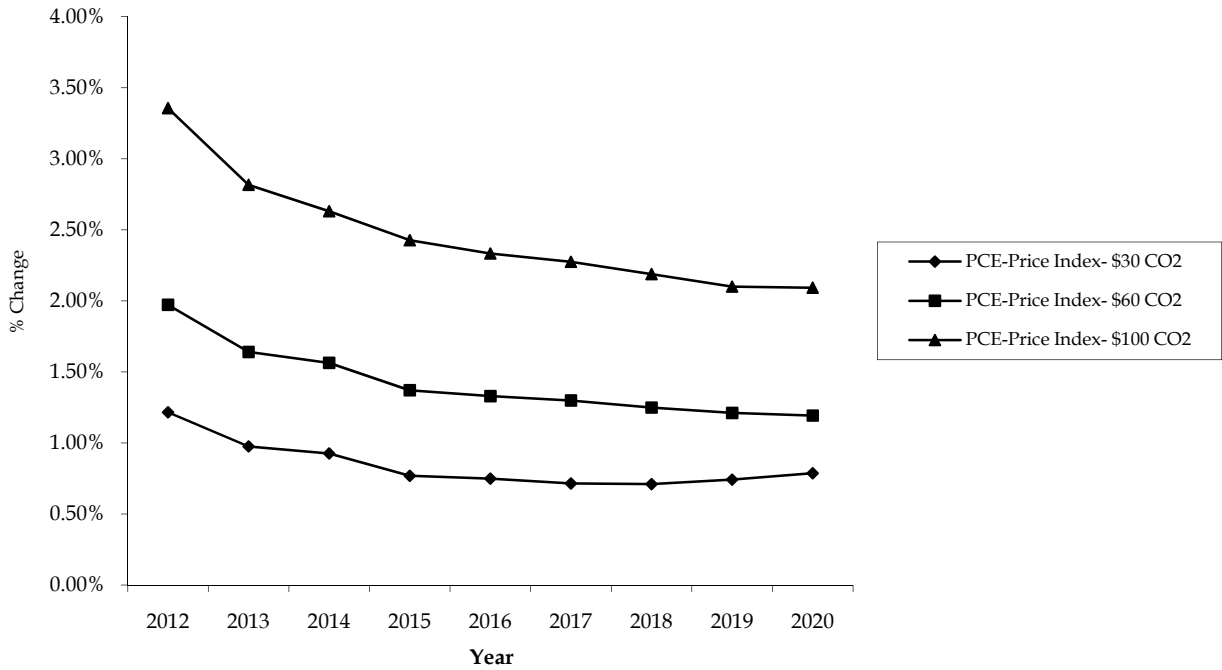


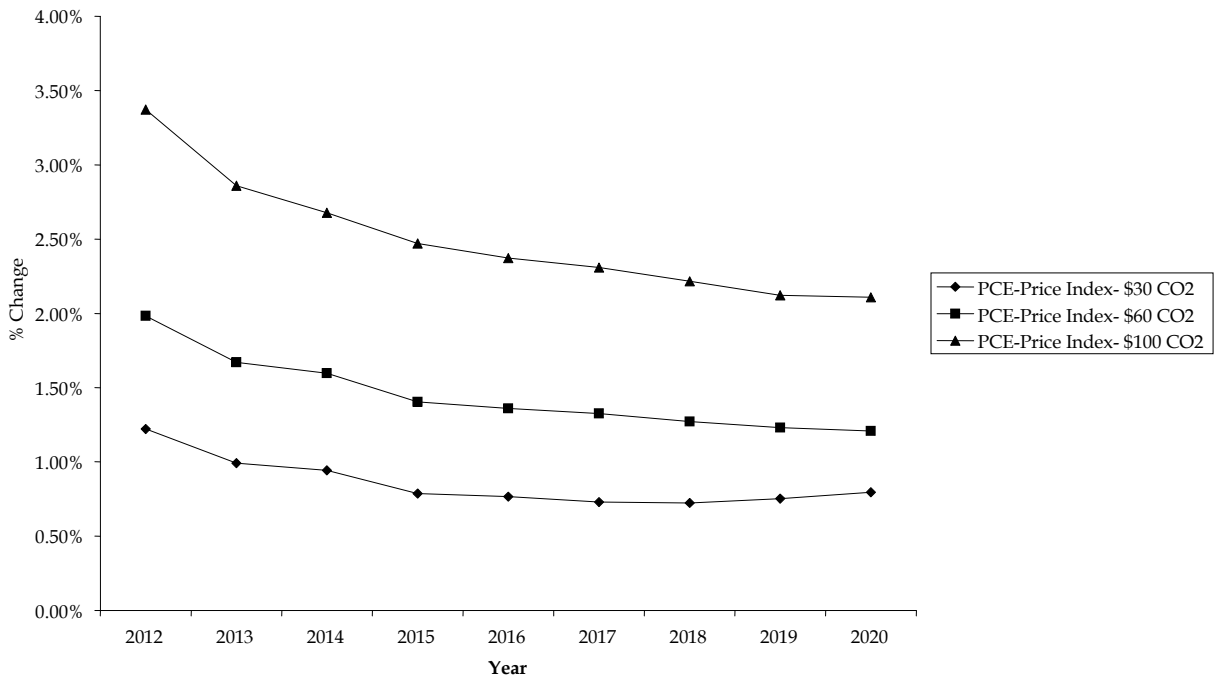
Figure 38: Scenario 2 - 25-50% of Allowance Revenue Allocated to R&D and
Deployment of Renewable Technologies
PCE- Price Index



**Figure 39: Scenario 3 - 50% of Allowance Revenue Used to Fund State Government General Fund Activities
PCE- Price Index**



**Figure 40: Scenario 4 - 95% of Allowance Revenue Used to Fund State Government General Fund Activities
PCE- Price Index**



5.9 Impacts on Energy-Intensive Industries

The negative impacts of the higher energy costs that would result from the imposition of a GHG emission allowance trading program would vary across the different industries in the Arizona economy depending upon difference in the relative amounts of electricity, natural gas and other fuels by each industry. Table 2 ranks 64 REMI private sector industries by an energy-intensity measure computed from REMI model results. This energy-intensity measure is the average percent change in production costs for each industry that would result from a 20 percent increase in fuel costs.¹⁶ By this measure, the most energy-intensive industries are in the transportation, manufacturing and mining sectors.

**Table 2: Relative Energy-Intensiveness Of REMI Private Sector Industries
(Percent change in cost of production from a 20% increase in fuel costs)¹⁷**

Industry	Increase in Cost of production
Pipeline transportation	6.14%
Air transportation	2.23%
Waste mgmnt, remed services	1.67%
Transit, ground pass transp	1.53%
Truck transp; Couriers, msngers	1.33%
Mining (except oil, gas)	1.19%
Chemical mfg	1.14%
Primary metal mfg	0.95%
Warehousing, storage	0.90%
Nonmetallic mineral prod mfg	0.85%
Support activities for mining	0.81%
Rail transportation	0.81%
Paper mfg	0.79%
Construction	0.68%
Scenic, sightseeing transp; supp	0.63%

¹⁶ The methodology used to calculate the energy-intensity measure is discussed in the technical appendix.

¹⁷ Does not include the REMI Utility or Personal Household sectors.

Textile mills	0.63%
Real estate	0.58%
Personal, laundry services	0.55%
Water transportation	0.54%
Plastics, rubber prod mfg	0.54%
Amusement, gambling, recreation	0.54%
Accommodation	0.48%
Food services, drinking places	0.47%
Social assistance	0.46%
Fabricated metal prod mfg	0.44%
Museums et al.	0.43%
Retail trade	0.38%
Nursing, residential care facilities	0.37%
Repair, maintenance	0.37%
Electrical equip, appliance mfg	0.36%
Printing, rel supp act	0.35%
Food mfg	0.35%
Beverage, tobacco prod mfg	0.34%
Forestry et al.	0.34%
Wood product mfg	0.34%
Mgmnt of companies, enterprises	0.34%
Furniture, related prod mfg	0.33%
Administrative, support services	0.32%
Educational services	0.32%
Transp equip mfg. exc. motor veh	0.32%
Machinery mfg	0.31%
Membership assoc, organ	0.30%
Computer, electronic prod mfg	0.29%
Miscellaneous mfg	0.28%
Textile prod mills	0.28%

Apparel mfg	0.28%
Leather, allied prod mfg	0.28%
Publishing, exc Internet	0.28%
Rental, leasing services	0.28%
Hospitals	0.27%
Monetary authorities, et al.	0.26%
Wholesale trade	0.26%
Broadcasting, exc Int; Telecomm	0.26%
Agriculture	0.25%
Performing arts, spectator sports	0.24%
Motion picture, sound rec	0.23%
Internet serv, data proc, other	0.22%
Ambulatory health care services	0.22%
Oil, gas extraction	0.21%
Motor vehicle mfg	0.21%
Prof, tech services	0.21%
Sec, comm contracts, inv	0.19%
Ins carriers, rel act	0.11%
Petroleum, coal prod mfg	0.06%

Source: Computed using REMI Arizona Model

However, many of the industries whose costs of production are most sensitive to fuel cost increases were not identified suffering the most severe employment impacts according the REMI results. Table 3, which again lists 64 private sector industries ranked by energy-intensity, shows estimates of percent decline in employment in 2012 and 2020 for each sector from the Scenario 1 simulation assuming a \$60 price for CO₂ allowances. The job loss data in the table show, for example, that the transportation sectors, which rank very high in terms of energy intensity, would have small job losses. Conversely, some of the sectors with relatively large employment declines, such as leather and apparel manufacturing, do not rate highly in terms of energy-intensity.

This can potentially be explained by varying final demand price elasticities across industries. Whilst the transportation sector ranks very high in terms of energy intensity (and therefore faces higher increases in the cost of production) it can potentially pass on some of these higher costs of production in the form of higher prices. If the final demand elasticity is inelastic – consumers are not very responsive to price changes - then the job impact would be lower.

Table 3: Percent Change in Employment, with Industries sorted by Energy Intensity - Based on Scenario 1 Simulation with \$60 CO₂ Price

Sectors	2012	2020	Rank
Pipeline transportation	-0.70%	1.44%	1
Air transportation	-0.61%	-0.15%	2
Waste mgmnt, remed services	-1.57%	-1.66%	3
Transit, ground pass transp	-0.92%	-0.75%	4
Truck transp; Couriers, msngrs	-1.01%	-0.81%	5
Mining (except oil, gas)	-0.23%	0.11%	6
Chemical mfg	-2.23%	-3.11%	7
Primary metal mfg	-1.27%	-2.28%	8
Warehousing, storage	-0.87%	-1.04%	9
Nonmetallic mineral prod mfg	-1.71%	-2.22%	10
Support activities for mining	-0.81%	-0.38%	11
Rail transportation	-0.63%	-0.65%	12
Paper mfg	-1.69%	-2.32%	13
Construction	-2.37%	-2.17%	14
Scenic, sightseeing transp; supp	-0.51%	-0.54%	15
Textile mills	-1.02%	-1.68%	16
Real estate	-2.53%	-2.00%	17
Personal, laundry services	-2.22%	-1.94%	18
Water transportation	-0.69%	-0.60%	19
Plastics, rubber prod mfg	-1.52%	-2.22%	20
Amusement, gambling, recreation	-2.12%	-1.86%	21
Accommodation	-1.32%	-1.39%	22

Food services, drinking places	-2.30%	-1.84%	23
Social assistance	-2.30%	-1.98%	24
Fabricated metal prod mfg	-1.25%	-1.91%	25
Museums et al.	-2.38%	-2.01%	26
Retail trade	-2.07%	-2.03%	27
Nursing, residential care facilities	-1.59%	-1.78%	28
Repair, maintenance	-1.19%	-1.57%	29
Electrical equip, appliance mfg	-1.30%	-2.14%	30
Printing, rel supp act	-1.55%	-2.14%	31
Food mfg	-1.83%	-2.03%	32
Beverage, tobacco prod mfg	-2.08%	-2.04%	33
Forestry et al.	-0.98%	-1.33%	34
Wood product mfg	-1.27%	-1.68%	35
Mgmt of companies, enterprises	-1.16%	-1.70%	36
Furniture, related prod mfg	-1.32%	-1.90%	37
Administrative, support services	-1.09%	-1.37%	38
Educational services	-2.01%	-1.90%	39
Transp equip mfg. exc. motor veh	-0.32%	-0.72%	40
Machinery mfg	-0.79%	-1.86%	41
Membership assoc, organ	-2.34%	-2.17%	42
Computer, electronic prod mfg	-0.61%	-1.26%	43
Miscellaneous mfg	-1.05%	-1.71%	44
Textile prod mills	-1.54%	-1.93%	45
Apparel mfg	-2.70%	-3.76%	46
Leather, allied prod mfg	-2.77%	-4.25%	47
Publishing, exc Internet	-1.21%	-2.00%	48
Rental, leasing services	-0.70%	-1.06%	49
Hospitals	-1.17%	-1.50%	50
Monetary authorities, et al.	-1.59%	-1.79%	51
Wholesale trade	-1.34%	-2.11%	52

Broadcasting, exc Int; Telecomm	-1.48%	-1.67%	53
Agriculture	-0.34%	-0.43%	54
Performing arts, spectator sports	-1.60%	-1.65%	55
Motion picture, sound rec	-1.99%	-2.05%	56
Internet serv, data proc, other	-1.28%	-1.84%	57
Ambulatory health care services	-1.03%	-1.33%	58
Oil, gas extraction	-0.25%	-0.37%	59
Motor vehicle mfg	-0.76%	-1.57%	60
Prof, tech services	-1.23%	-1.82%	61
Sec, comm contracts, inv	-1.90%	-2.43%	62
Ins carriers, rel act	-1.42%	-1.79%	63
Petroleum, coal prod mfg	-1.21%	-1.85%	64

Source: REMI Arizona model simulation results.

Job losses in the top 20 energy-intensive industries would be 14,000 in 2012 (Table 4), about 27 percent of total private sector total (excluding the utilities and private households) only a little higher than their overall share of employment of 21 percent. Looking at the relative impact in a different way, employment in the top 20 energy intensive industries would decrease 2.09 percent in 2012 compared with an average of 1.54 percent for the remaining 42 industries (Table 5). Over time, the relative magnitude of the impacts would become more evenly spread across the Arizona economy. By 2020 the differences in the relative magnitude of the negative impacts on employment would shrink to 1.83 percent for the top 20 energy-intensive industries versus 1.74 percent for the less energy-intensive sectors.

Table 4: Job Losses in Top 20 Energy Intensive Industries Compared to Rest of Industries

Job Losses	2012	2020
Top 20 Energy Intensive Industries	-14,081	-14,294
Remaining industries	-38,092	-51,165

**Table 5: Average Percent Change in Employment in Top 20 Energy Intensive Industries
Compared to Rest of Industries**

Average Percent Change in Employment	2012	2020
Top 20 Energy Intensive Industries	-2.09%	-1.83%
Remaining industries	-1.54%	-1.74%

6. Arizona’s Relative Competitive Position

An important policy issue is what impacts the imposition of a GHG emission allowance trading program might have on the competitive position of Arizona vis-à-vis other WCI-member states. Unfortunately, the results of this REMI analysis cannot directly address this issue because it only provides estimates of the impacts on the Arizona economy.

An indirect indicator of how Arizona’s relative competitive position might be affected by the introduction of a GHG emission allowance trading program is to examine CO₂ per capita levels.

Table 6: Per Capita CO₂ levels for US States in WECC

State	CO ₂ Output LBS per Capita
Washington	26,118
Oregon	27,374
California	29,191
Arizona	36,587
New Mexico	50,063
Utah	54,295
Montana	57,489

Source: EIA

Arizona is ranked 4th lowest out of the seven US WCI states presented. Oregon, Washington and California all have lower CO₂ output per capita levels than Arizona. Therefore against these states Arizona could face a reduction in competitiveness.

7. Conclusions

The goal of the study is to provide all interested parties in the state with an assessment of what the imposition of a greenhouse gas (GHG) emission allowance trading program, such as the WCI cap-and-trade system, would do to state economic activity in terms of macroeconomic measures such as gross state product, employment, income, and population. To do this, it made use of an Arizona-specific version of the REMI regional forecasting model to produce numeric estimates of the impacts of such a program on the Arizona economy.

The analysis was based upon a stripped-down view of all the changes that would occur over time with the imposition of a greenhouse gas (GHG) emission allowance trading program. Its primary focus was evaluating the macroeconomic effects of such a such a program on the basis of its three main direct effects on the state's economy: (1) the cost of the allowances would increase the production costs of the utilities and fuel distributors; (2) the market prices of energy and fuels would rise; and (3) the proceeds from the sale of the allowances would have a direct impact to the extent that they were recycled back into the Arizona economy.

The method and the scenarios used in the analysis are a plausible representation of the effects of a greenhouse gas (GHG) emission allowance trading program, at three different price levels. The results of this study provide empirical evidence based on reasonable assumptions and an accepted methodology. As such, the findings should be a useful input in the debate surrounding the imposition of a greenhouse gas (GHG) emission allowance trading program.

The analysis conducted does not attempt to predict the structure of GHG regulation, nor does it predict how the market for carbon allowances will behave, rather the study illustrates the impact various allowance price levels will have on Arizona's economy. While REMI is a dynamic model that incorporates technological change and adaptive behavior of firms and households, the structure and parameters in the model are fundamentally based on the statistical analysis of historical relationships. To the extent that the policies or programs being evaluated may result in fundamental economic changes, its forecasts - particularly longer-term

forecasts – may not produce results that should be used as accurate predictions of the future values of specific variables.

At the commissioning of this analysis the WCI was discussing the possibility of 100 percent auctioning of allowances; additionally the Obama administration at the federal level was advocating for a 100 percent auctioning approach. Thus throughout the analysis it has been assumed that all allowances would be auctioned. If, alternatively, *less* than 100 percent of the allowances were auctioned off with the remainder allocated "free of charge" then the negative economic impacts of such a cap-and-trade program would be lessened.

The degree to which the economic impacts to Arizona may be lessened is largely dependent on the means by which allowances are allocated. In the event allowances are allocated directly to entities that utilize the allowances solely to reduce their compliance costs, the impact on energy prices will be lessened and thus the overall economic impact. The reason is simple - partial allocation in this manner leads to a reduced *average* price per allowance (since the average price is across all allowances). It should be noted that there are many different ways to freely allocate emission allowances, these differences will also affect the degree to which the negative economic impacts are reduced; however even if 100 percent of allowances are freely allocated there will still be economic costs.¹⁸

The results of the simulations indicate that the imposition of a GHG emission allowance trading program would have significant negative impacts on the Arizona economy. This negative impact occurs even though in the simulations it has been assumed that current RES standards are being met in the baseline case. If current RES standards are not met then the negative impacts could well be higher.¹⁹ These basic results held under different assumptions concerning the price of the allowances and of the disposition of the proceeds of the sale of the allowances. Rather than focusing on the precise numerical estimates, two more qualitative findings provide key insights relating to the economic effects the imposition of a greenhouse gas (GHG) emission allowance trading program:

¹⁸ Assuming that the total number of allowances creates a binding constraint.

¹⁹ This is because the assumed *percentage increase* in input prices due to a cap-trade-program would be higher if RES standards are not met.

- The size of the negative impacts is directly and approximately proportionally related to the price of the allowances – a \$100 price for the CO₂ allowances is estimated to have approximately three times the effect of a \$30 price. This finding emphasizes the importance of the issues of what the market price will be and how will it change over time. This analysis did not attempt to address these questions – instead taking the simpler approach of producing multiple simulations based alternative price levels. These results indicate that the market for allowances is a key issue for policy makers.
- The alternative assumptions relating to the distribution of the proceeds from the sale of the CO₂ allowances produced relatively similar results. Scenario 1 with no "recycling" of the proceeds did have relatively larger negative impacts, but the negative effects still remained with some "recycling" and generally were not that much smaller. Of course, these findings were based on only two different scenarios of how the proceeds might be recycled – more thought and analysis of how these funds could/would be used should also be a priority.

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Appendix

Table A1: Gross State Product- Percentage Change Compared to Control

Scenarios	CO ₂ Price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	\$30 CO ₂	-0.86%	-0.94%	-1.04%	-1.03%	-1.06%	-1.07%	-1.08%	-1.14%	-1.19%
Scenario 1	\$60 CO ₂	-1.48%	-1.66%	-1.85%	-1.90%	-1.97%	-2.02%	-2.02%	-2.03%	-2.03%
Scenario 1	\$100 CO ₂	-2.30%	-2.60%	-2.87%	-2.99%	-3.09%	-3.17%	-3.19%	-3.20%	-3.23%
Scenario 2	\$30 CO ₂	-0.81%	-0.87%	-0.94%	-0.91%	-0.91%	-0.89%	-0.90%	-0.93%	-0.97%
Scenario 2	\$60 CO ₂	-1.13%	-1.22%	-1.32%	-1.30%	-1.31%	-1.30%	-1.27%	-1.25%	-1.23%
Scenario 2	\$100 CO ₂	-2.15%	-2.40%	-2.62%	-2.70%	-2.75%	-2.78%	-2.78%	-2.76%	-2.76%
Scenario 3	\$30 CO ₂	-0.63%	-0.70%	-0.79%	-0.79%	-0.82%	-0.83%	-0.85%	-0.91%	-0.96%
Scenario 3	\$60 CO ₂	-1.00%	-1.17%	-1.36%	-1.41%	-1.49%	-1.54%	-1.56%	-1.57%	-1.59%
Scenario 3	\$100 CO ₂	-1.65%	-1.94%	-2.22%	-2.37%	-2.49%	-2.59%	-2.64%	-2.67%	-2.72%
Scenario 4	\$30 CO ₂	-0.41%	-0.47%	-0.56%	-0.55%	-0.58%	-0.60%	-0.62%	-0.68%	-0.73%
Scenario 4	\$60 CO ₂	-0.58%	-0.73%	-0.91%	-0.97%	-1.05%	-1.12%	-1.14%	-1.16%	-1.18%
Scenario 4	\$100 CO ₂	-1.06%	-1.34%	-1.64%	-1.80%	-1.94%	-2.06%	-2.13%	-2.18%	-2.25%

Table A2: Total Employment- Percentage Change Compared to Control

Scenarios	CO ₂ Price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	\$30 CO ₂	-0.87%	-0.92%	-0.98%	-0.95%	-0.95%	-0.95%	-0.95%	-1.00%	-1.04%
Scenario 1	\$60 CO ₂	-1.48%	-1.60%	-1.74%	-1.74%	-1.77%	-1.78%	-1.76%	-1.74%	-1.73%
Scenario 1	\$100 CO ₂	-2.33%	-2.55%	-2.74%	-2.79%	-2.84%	-2.86%	-2.85%	-2.82%	-2.83%
Scenario 2	\$30 CO ₂	-0.80%	-0.83%	-0.87%	-0.82%	-0.80%	-0.77%	-0.76%	-0.80%	-0.83%
Scenario 2	\$60 CO ₂	-1.11%	-1.14%	-1.20%	-1.13%	-1.11%	-1.07%	-1.03%	-1.00%	-0.97%
Scenario 2	\$100 CO ₂	-2.15%	-2.32%	-2.47%	-2.48%	-2.48%	-2.46%	-2.43%	-2.39%	-2.38%
Scenario 3	\$30 CO ₂	-0.55%	-0.58%	-0.64%	-0.61%	-0.62%	-0.61%	-0.62%	-0.67%	-0.71%
Scenario 3	\$60 CO ₂	-0.83%	-0.93%	-1.06%	-1.06%	-1.11%	-1.13%	-1.12%	-1.12%	-1.12%
Scenario 3	\$100 CO ₂	-1.44%	-1.64%	-1.85%	-1.94%	-2.01%	-2.07%	-2.09%	-2.09%	-2.12%
Scenario 4	\$30 CO ₂	-0.24%	-0.26%	-0.32%	-0.28%	-0.29%	-0.29%	-0.30%	-0.35%	-0.40%
Scenario 4	\$60 CO ₂	-0.34%	-0.38%	-0.45%	-0.46%	-0.51%	-0.55%	-0.55%	-0.56%	-0.57%
Scenario 4	\$100 CO ₂	-0.63%	-0.82%	-1.06%	-1.17%	-1.26%	-1.35%	-1.40%	-1.43%	-1.48%

Table A3: State Revenues at State Average Rates- Percentage Change Compared to Control

Scenarios	CO ₂ Price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	\$30 CO ₂	-1.46%	-1.39%	-1.45%	-1.37%	-1.40%	-1.40%	-1.43%	-1.51%	-1.59%
Scenario 1	\$60 CO ₂	-2.42%	-2.38%	-2.52%	-2.47%	-2.54%	-2.59%	-2.59%	-2.60%	-2.61%
Scenario 1	\$100 CO ₂	-3.94%	-3.90%	-4.06%	-4.10%	-4.19%	-4.27%	-4.29%	-4.28%	-4.34%
Scenario 2	\$30 CO ₂	-1.38%	-1.29%	-1.34%	-1.23%	-1.24%	-1.22%	-1.24%	-1.30%	-1.38%
Scenario 2	\$60 CO ₂	-1.86%	-1.74%	-1.81%	-1.70%	-1.71%	-1.71%	-1.69%	-1.68%	-1.67%
Scenario 2	\$100 CO ₂	-3.74%	-3.66%	-3.78%	-3.79%	-3.83%	-3.87%	-3.87%	-3.85%	-3.89%
Scenario 3	\$30 CO ₂	-0.38%	-0.31%	-0.39%	-0.33%	-0.38%	-0.40%	-0.45%	-0.55%	-0.65%
Scenario 3	\$60 CO ₂	-0.33%	-0.31%	-0.49%	-0.50%	-0.62%	-0.73%	-0.80%	-0.86%	-0.93%
Scenario 3	\$100 CO ₂	-1.08%	-1.14%	-1.45%	-1.63%	-1.83%	-2.04%	-2.17%	-2.27%	-2.43%
Scenario 4	\$30 CO ₂	0.55%	0.62%	0.53%	0.59%	0.52%	0.48%	0.41%	0.30%	0.18%
Scenario 4	\$60 CO ₂	1.44%	1.45%	1.23%	1.19%	1.02%	0.86%	0.74%	0.62%	0.51%
Scenario 4	\$100 CO ₂	1.33%	1.22%	0.78%	0.49%	0.19%	-0.12%	-0.36%	-0.55%	-0.80%

Table A4: Retail Trade - Percentage Change Compared to Control

Scenarios	CO₂ Price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	\$30 CO ₂	-1.26%	-1.26%	-1.33%	-1.28%	-1.29%	-1.28%	-1.29%	-1.36%	-1.42%
Scenario 1	\$60 CO ₂	-2.16%	-2.23%	-2.38%	-2.36%	-2.40%	-2.43%	-2.41%	-2.40%	-2.40%
Scenario 1	\$100 CO ₂	-3.37%	-3.51%	-3.70%	-3.76%	-3.83%	-3.88%	-3.88%	-3.86%	-3.90%
Scenario 2	\$30 CO ₂	-1.22%	-1.20%	-1.25%	-1.18%	-1.17%	-1.14%	-1.14%	-1.20%	-1.25%
Scenario 2	\$60 CO ₂	-1.78%	-1.76%	-1.83%	-1.75%	-1.75%	-1.73%	-1.69%	-1.65%	-1.63%
Scenario 2	\$100 CO ₂	-3.25%	-3.35%	-3.51%	-3.53%	-3.56%	-3.57%	-3.55%	-3.51%	-3.53%
Scenario 3	\$30 CO ₂	-0.98%	-0.97%	-1.03%	-0.98%	-0.99%	-0.98%	-0.99%	-1.06%	-1.12%
Scenario 3	\$60 CO ₂	-1.59%	-1.64%	-1.78%	-1.75%	-1.80%	-1.84%	-1.83%	-1.82%	-1.83%
Scenario 3	\$100 CO ₂	-2.59%	-2.71%	-2.92%	-2.99%	-3.08%	-3.15%	-3.18%	-3.18%	-3.24%
Scenario 4	\$30 CO ₂	-0.71%	-0.69%	-0.74%	-0.68%	-0.69%	-0.69%	-0.70%	-0.77%	-0.83%
Scenario 4	\$60 CO ₂	-1.08%	-1.10%	-1.23%	-1.21%	-1.26%	-1.30%	-1.30%	-1.30%	-1.31%
Scenario 4	\$100 CO ₂	-1.89%	-1.99%	-2.21%	-2.30%	-2.41%	-2.50%	-2.55%	-2.57%	-2.64%

Table A5: Real Disposable Personal Income per Capita- Percentage Change Compared to Control

Scenarios	CO ₂ Price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	\$30 CO ₂	-1.47%	-1.14%	-1.03%	-0.78%	-0.69%	-0.60%	-0.54%	-0.55%	-0.56%
Scenario 1	\$60 CO ₂	-2.42%	-1.97%	-1.80%	-1.47%	-1.31%	-1.17%	-1.02%	-0.89%	-0.79%
Scenario 1	\$100 CO ₂	-3.98%	-3.27%	-2.91%	-2.50%	-2.21%	-1.98%	-1.72%	-1.48%	-1.35%
Scenario 2	\$30 CO ₂	-1.43%	-1.10%	-0.98%	-0.73%	-0.63%	-0.53%	-0.47%	-0.48%	-0.49%
Scenario 2	\$60 CO ₂	-1.93%	-1.49%	-1.33%	-1.02%	-0.89%	-0.78%	-0.66%	-0.56%	-0.49%
Scenario 2	\$100 CO ₂	-3.88%	-3.16%	-2.79%	-2.37%	-2.07%	-1.82%	-1.57%	-1.34%	-1.22%
Scenario 3	\$30 CO ₂	-1.20%	-0.91%	-0.83%	-0.61%	-0.54%	-0.47%	-0.44%	-0.46%	-0.48%
Scenario 3	\$60 CO ₂	-1.87%	-1.49%	-1.38%	-1.11%	-1.01%	-0.92%	-0.81%	-0.72%	-0.65%
Scenario 3	\$100 CO ₂	-3.23%	-2.63%	-2.37%	-2.06%	-1.85%	-1.69%	-1.49%	-1.31%	-1.23%
Scenario 4	\$30 CO ₂	-0.94%	-0.68%	-0.62%	-0.43%	-0.39%	-0.34%	-0.33%	-0.36%	-0.40%
Scenario 4	\$60 CO ₂	-1.38%	-1.06%	-1.00%	-0.78%	-0.73%	-0.69%	-0.62%	-0.56%	-0.53%
Scenario 4	\$100 CO ₂	-2.55%	-2.05%	-1.89%	-1.66%	-1.52%	-1.43%	-1.29%	-1.16%	-1.12%

Table A6: Population- Percentage Change Compared to Control

Scenarios	CO ₂ Price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	\$30 CO ₂	-0.22%	-0.39%	-0.53%	-0.64%	-0.73%	-0.81%	-0.87%	-0.93%	-1.00%
Scenario 1	\$60 CO ₂	-0.37%	-0.66%	-0.91%	-1.11%	-1.28%	-1.43%	-1.55%	-1.65%	-1.73%
Scenario 1	\$100 CO ₂	-0.61%	-1.09%	-1.50%	-1.84%	-2.13%	-2.38%	-2.58%	-2.75%	-2.89%
Scenario 2	\$30 CO ₂	-0.21%	-0.37%	-0.51%	-0.61%	-0.69%	-0.75%	-0.80%	-0.85%	-0.90%
Scenario 2	\$60 CO ₂	-0.29%	-0.50%	-0.69%	-0.83%	-0.94%	-1.03%	-1.10%	-1.16%	-1.20%
Scenario 2	\$100 CO ₂	-0.59%	-1.05%	-1.44%	-1.76%	-2.02%	-2.24%	-2.42%	-2.56%	-2.68%
Scenario 3	\$30 CO ₂	-0.17%	-0.29%	-0.40%	-0.48%	-0.55%	-0.60%	-0.64%	-0.69%	-0.74%
Scenario 3	\$60 CO ₂	-0.26%	-0.46%	-0.65%	-0.79%	-0.91%	-1.01%	-1.10%	-1.17%	-1.23%
Scenario 3	\$100 CO ₂	-0.47%	-0.83%	-1.15%	-1.41%	-1.64%	-1.84%	-2.01%	-2.15%	-2.27%
Scenario 4	\$30 CO ₂	-0.12%	-0.20%	-0.28%	-0.32%	-0.36%	-0.40%	-0.42%	-0.46%	-0.49%
Scenario 4	\$60 CO ₂	-0.17%	-0.29%	-0.41%	-0.49%	-0.57%	-0.63%	-0.69%	-0.74%	-0.78%
Scenario 4	\$100 CO ₂	-0.34%	-0.59%	-0.83%	-1.03%	-1.20%	-1.36%	-1.49%	-1.61%	-1.71%

Table A7: Personal Income

Scenarios	CO₂ Price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	\$30 CO ₂	-0.53%	-0.62%	-0.70%	-0.71%	-0.73%	-0.74%	-0.75%	-0.78%	-0.81%
Scenario 1	\$60 CO ₂	-0.91%	-1.09%	-1.24%	-1.29%	-1.35%	-1.38%	-1.38%	-1.38%	-1.38%
Scenario 1	\$100 CO ₂	-1.43%	-1.73%	-1.96%	-2.07%	-2.16%	-2.21%	-2.23%	-2.23%	-2.24%
Scenario 2	\$30 CO ₂	-0.49%	-0.56%	-0.62%	-0.61%	-0.61%	-0.60%	-0.60%	-0.62%	-0.64%
Scenario 2	\$60 CO ₂	-0.67%	-0.76%	-0.84%	-0.84%	-0.84%	-0.83%	-0.80%	-0.78%	-0.76%
Scenario 2	\$100 CO ₂	-1.30%	-1.56%	-1.75%	-1.83%	-1.87%	-1.89%	-1.89%	-1.87%	-1.86%
Scenario 3	\$30 CO ₂	-0.35%	-0.42%	-0.48%	-0.48%	-0.50%	-0.51%	-0.52%	-0.55%	-0.58%
Scenario 3	\$60 CO ₂	-0.53%	-0.67%	-0.80%	-0.84%	-0.89%	-0.92%	-0.93%	-0.93%	-0.94%
Scenario 3	\$100 CO ₂	-0.92%	-1.16%	-1.37%	-1.49%	-1.58%	-1.64%	-1.68%	-1.69%	-1.72%
Scenario 4	\$30 CO ₂	-0.17%	-0.22%	-0.27%	-0.26%	-0.28%	-0.28%	-0.29%	-0.32%	-0.35%
Scenario 4	\$60 CO ₂	-0.20%	-0.29%	-0.40%	-0.43%	-0.47%	-0.50%	-0.52%	-0.53%	-0.54%
Scenario 4	\$100 CO ₂	-0.46%	-0.65%	-0.85%	-0.96%	-1.05%	-1.13%	-1.17%	-1.20%	-1.25%

Table A8: Personal Consumption Expenditure Price Index

Scenarios	CO₂ Price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	\$30 CO ₂	1.19%	0.94%	0.89%	0.73%	0.71%	0.68%	0.68%	0.71%	0.76%
Scenario 1	\$60 CO ₂	1.96%	1.61%	1.53%	1.33%	1.30%	1.27%	1.22%	1.19%	1.18%
Scenario 1	\$100 CO ₂	3.34%	2.77%	2.58%	2.38%	2.29%	2.24%	2.16%	2.08%	2.08%
Scenario 2	\$30 CO ₂	1.19%	0.94%	0.89%	0.74%	0.72%	0.69%	0.69%	0.73%	0.77%
Scenario 2	\$60 CO ₂	1.61%	1.28%	1.21%	1.04%	1.02%	1.01%	0.97%	0.95%	0.95%
Scenario 2	\$100 CO ₂	3.34%	2.78%	2.60%	2.40%	2.31%	2.26%	2.18%	2.10%	2.10%
Scenario 3	\$30 CO ₂	1.22%	0.98%	0.93%	0.77%	0.75%	0.71%	0.71%	0.74%	0.79%
Scenario 3	\$60 CO ₂	1.97%	1.64%	1.56%	1.37%	1.33%	1.30%	1.25%	1.21%	1.19%
Scenario 3	\$100 CO ₂	3.36%	2.82%	2.63%	2.43%	2.33%	2.27%	2.19%	2.10%	2.09%
Scenario 4	\$30 CO ₂	1.22%	0.99%	0.94%	0.79%	0.77%	0.73%	0.72%	0.75%	0.80%
Scenario 4	\$60 CO ₂	1.98%	1.67%	1.60%	1.40%	1.36%	1.33%	1.27%	1.23%	1.21%
Scenario 4	\$100 CO ₂	3.37%	2.86%	2.68%	2.47%	2.37%	2.31%	2.22%	2.12%	2.11%

Table A9: Change in Gross State Product, Scenario 1: No Distribution of Allowances

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.27%	-0.32%	-0.37%	-0.37%	-0.38%	-0.39%	-0.40%	-0.43%	-0.46%
Forestry, Fishing, Other	\$60 CO ₂	-0.48%	-0.58%	-0.67%	-0.70%	-0.74%	-0.77%	-0.78%	-0.79%	-0.80%
Forestry, Fishing, Other	\$100 CO ₂	-0.72%	-0.88%	-1.01%	-1.08%	-1.15%	-1.20%	-1.23%	-1.26%	-1.29%
Mining	\$30 CO ₂	-0.31%	-0.44%	-0.53%	-0.55%	-0.57%	-0.57%	-0.57%	-0.60%	-0.63%
Mining	\$60 CO ₂	-0.53%	-0.79%	-0.97%	-1.04%	-1.10%	-1.14%	-1.14%	-1.14%	-1.13%
Mining	\$100 CO ₂	-0.81%	-1.19%	-1.47%	-1.62%	-1.71%	-1.78%	-1.82%	-1.84%	-1.86%
Utilities	\$30 CO ₂	-1.38%	-1.58%	-1.82%	-1.83%	-1.92%	-1.97%	-2.01%	-2.07%	-2.16%
Utilities	\$60 CO ₂	-2.24%	-2.70%	-3.13%	-3.26%	-3.43%	-3.54%	-3.58%	-3.59%	-3.58%
Utilities	\$100 CO ₂	-3.74%	-4.34%	-4.87%	-5.10%	-5.26%	-5.38%	-5.38%	-5.33%	-5.32%
Construction	\$30 CO ₂	-1.51%	-2.00%	-2.19%	-2.10%	-1.99%	-1.87%	-1.77%	-1.74%	-1.75%
Construction	\$60 CO ₂	-2.54%	-3.43%	-3.82%	-3.78%	-3.66%	-3.51%	-3.29%	-3.08%	-2.90%
Construction	\$100 CO ₂	-4.05%	-5.51%	-6.08%	-6.11%	-5.94%	-5.69%	-5.37%	-5.02%	-4.74%
Manufacturing	\$30 CO ₂	-0.49%	-0.64%	-0.75%	-0.80%	-0.84%	-0.87%	-0.90%	-0.94%	-0.98%
Manufacturing	\$60 CO ₂	-0.87%	-1.15%	-1.37%	-1.49%	-1.59%	-1.66%	-1.70%	-1.73%	-1.74%
Manufacturing	\$100 CO ₂	-1.30%	-1.73%	-2.04%	-2.24%	-2.39%	-2.51%	-2.58%	-2.63%	-2.68%

Wholesale Trade	\$30 CO ₂	-0.80%	-0.95%	-1.08%	-1.13%	-1.19%	-1.22%	-1.25%	-1.30%	-1.35%
Wholesale Trade	\$60 CO ₂	-1.39%	-1.71%	-1.96%	-2.10%	-2.22%	-2.30%	-2.33%	-2.35%	-2.35%
Wholesale Trade	\$100 CO ₂	-2.12%	-2.58%	-2.92%	-3.14%	-3.30%	-3.41%	-3.47%	-3.49%	-3.51%
Retail Trade	\$30 CO ₂	-1.26%	-1.26%	-1.33%	-1.28%	-1.29%	-1.28%	-1.29%	-1.36%	-1.42%
Retail Trade	\$60 CO ₂	-2.16%	-2.23%	-2.38%	-2.36%	-2.40%	-2.43%	-2.41%	-2.40%	-2.40%
Retail Trade	\$100 CO ₂	-3.37%	-3.51%	-3.70%	-3.76%	-3.83%	-3.88%	-3.88%	-3.86%	-3.90%
Transp, Warehousing	\$30 CO ₂	-0.58%	-0.70%	-0.81%	-0.85%	-0.90%	-0.93%	-0.96%	-1.00%	-1.05%
Transp, Warehousing	\$60 CO ₂	-1.00%	-1.24%	-1.45%	-1.56%	-1.66%	-1.73%	-1.78%	-1.81%	-1.83%
Transp, Warehousing	\$100 CO ₂	-1.56%	-1.93%	-2.23%	-2.43%	-2.59%	-2.70%	-2.78%	-2.83%	-2.88%
Information	\$30 CO ₂	-0.89%	-0.93%	-1.03%	-1.01%	-1.04%	-1.06%	-1.09%	-1.15%	-1.21%
Information	\$60 CO ₂	-1.46%	-1.60%	-1.79%	-1.83%	-1.91%	-1.98%	-2.00%	-2.03%	-2.05%
Information	\$100 CO ₂	-2.38%	-2.60%	-2.84%	-2.96%	-3.07%	-3.17%	-3.22%	-3.25%	-3.30%
Finance, Insurance	\$30 CO ₂	-0.96%	-1.00%	-1.08%	-1.05%	-1.07%	-1.08%	-1.10%	-1.17%	-1.22%
Finance, Insurance	\$60 CO ₂	-1.65%	-1.77%	-1.94%	-1.96%	-2.03%	-2.07%	-2.07%	-2.08%	-2.09%
Finance, Insurance	\$100 CO ₂	-2.55%	-2.76%	-2.99%	-3.08%	-3.18%	-3.25%	-3.29%	-3.31%	-3.36%
Real Estate and Leasing	\$30 CO ₂	-1.37%	-1.31%	-1.36%	-1.27%	-1.26%	-1.23%	-1.23%	-1.30%	-1.34%
Real Estate and Leasing	\$60 CO ₂	-2.35%	-2.32%	-2.44%	-2.37%	-2.39%	-2.38%	-2.32%	-2.28%	-2.24%

Real Estate and Leasing	\$100 CO ₂	-3.61%	-3.63%	-3.78%	-3.77%	-3.78%	-3.77%	-3.71%	-3.65%	-3.64%
Profess, Tech Services	\$30 CO ₂	-0.74%	-0.85%	-0.96%	-0.98%	-1.01%	-1.03%	-1.06%	-1.11%	-1.17%
Profess, Tech Services	\$60 CO ₂	-1.27%	-1.51%	-1.72%	-1.80%	-1.89%	-1.95%	-1.98%	-2.00%	-2.02%
Profess, Tech Services	\$100 CO ₂	-1.97%	-2.34%	-2.64%	-2.81%	-2.94%	-3.05%	-3.11%	-3.14%	-3.20%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.72%	-0.84%	-0.95%	-0.98%	-1.01%	-1.04%	-1.06%	-1.12%	-1.18%
Mngmt of Companies, Enterprises	\$60 CO ₂	-1.24%	-1.50%	-1.72%	-1.82%	-1.92%	-1.99%	-2.02%	-2.05%	-2.07%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.89%	-2.29%	-2.61%	-2.80%	-2.95%	-3.07%	-3.14%	-3.19%	-3.26%
Admin, Waste Services	\$30 CO ₂	-0.70%	-0.77%	-0.86%	-0.85%	-0.88%	-0.89%	-0.90%	-0.96%	-1.00%
Admin, Waste Services	\$60 CO ₂	-1.19%	-1.36%	-1.53%	-1.57%	-1.64%	-1.69%	-1.70%	-1.71%	-1.72%
Admin, Waste Services	\$100 CO ₂	-1.86%	-2.13%	-2.37%	-2.49%	-2.59%	-2.67%	-2.71%	-2.74%	-2.78%
Educational Services	\$30 CO ₂	-1.22%	-1.18%	-1.23%	-1.16%	-1.17%	-1.16%	-1.18%	-1.25%	-1.32%
Educational Services	\$60 CO ₂	-2.08%	-2.07%	-2.19%	-2.15%	-2.20%	-2.23%	-2.21%	-2.21%	-2.21%
Educational Services	\$100 CO ₂	-3.24%	-3.26%	-3.42%	-3.45%	-3.51%	-3.56%	-3.57%	-3.57%	-3.62%
Health Care, Social Asst	\$30 CO ₂	-0.74%	-0.74%	-0.80%	-0.79%	-0.82%	-0.85%	-0.88%	-0.95%	-1.01%
Health Care, Social Asst	\$60 CO ₂	-1.24%	-1.28%	-1.41%	-1.43%	-1.51%	-1.57%	-1.61%	-1.65%	-1.69%
Health Care, Social Asst	\$100 CO ₂	-2.00%	-2.09%	-2.26%	-2.36%	-2.47%	-2.59%	-2.66%	-2.72%	-2.81%

Arts, Entertainment, Rec	\$30 CO ₂	-1.18%	-1.16%	-1.22%	-1.16%	-1.17%	-1.16%	-1.18%	-1.24%	-1.30%
Arts, Entertainment, Rec	\$60 CO ₂	-2.02%	-2.04%	-2.17%	-2.15%	-2.19%	-2.22%	-2.20%	-2.19%	-2.19%
Arts, Entertainment, Rec	\$100 CO ₂	-3.14%	-3.21%	-3.39%	-3.43%	-3.49%	-3.54%	-3.54%	-3.53%	-3.56%
Accommodation, Food Services	\$30 CO ₂	-1.22%	-1.17%	-1.22%	-1.16%	-1.16%	-1.15%	-1.16%	-1.23%	-1.29%
Accommodation, Food Services	\$60 CO ₂	-2.08%	-2.08%	-2.20%	-2.16%	-2.20%	-2.22%	-2.19%	-2.18%	-2.18%
Accommodation, Food Services	\$100 CO ₂	-3.21%	-3.24%	-3.39%	-3.42%	-3.48%	-3.53%	-3.52%	-3.51%	-3.54%
Other Services (excl Gov)	\$30 CO ₂	-1.12%	-1.12%	-1.19%	-1.14%	-1.17%	-1.18%	-1.20%	-1.27%	-1.33%
Other Services (excl Gov)	\$60 CO ₂	-1.88%	-1.94%	-2.10%	-2.09%	-2.16%	-2.21%	-2.21%	-2.22%	-2.24%
Other Services (excl Gov)	\$100 CO ₂	-3.00%	-3.11%	-3.32%	-3.40%	-3.50%	-3.58%	-3.61%	-3.62%	-3.67%

Table A10: Change in Gross State Product, Scenario 2: 25- 50% of Allowances Allocated to R&D and Deployment of Renewable Technologies

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.27%	-0.32%	-0.36%	-0.36%	-0.38%	-0.38%	-0.39%	-0.42%	-0.44%
Forestry, Fishing, Other	\$60 CO ₂	-0.41%	-0.50%	-0.58%	-0.60%	-0.63%	-0.66%	-0.67%	-0.67%	-0.68%
Forestry, Fishing, Other	\$100 CO ₂	-0.70%	-0.86%	-0.99%	-1.07%	-1.13%	-1.18%	-1.21%	-1.24%	-1.27%
Mining	\$30 CO ₂	-0.30%	-0.42%	-0.49%	-0.50%	-0.49%	-0.48%	-0.46%	-0.47%	-0.48%
Mining	\$60 CO ₂	-0.45%	-0.64%	-0.75%	-0.78%	-0.79%	-0.78%	-0.75%	-0.72%	-0.68%
Mining	\$100 CO ₂	-0.79%	-1.14%	-1.37%	-1.48%	-1.53%	-1.56%	-1.56%	-1.54%	-1.53%
Utilities	\$30 CO ₂	-1.35%	-1.21%	-1.07%	-0.68%	-0.35%	0.04%	0.45%	0.81%	1.09%
Utilities	\$60 CO ₂	-1.30%	-0.70%	-0.12%	0.69%	1.42%	2.19%	3.00%	3.71%	4.36%
Utilities	\$100 CO ₂	-3.67%	-3.38%	-2.93%	-2.19%	-1.38%	-0.52%	0.45%	1.32%	2.05%
Construction	\$30 CO ₂	-1.33%	-1.75%	-1.87%	-1.71%	-1.54%	-1.34%	-1.21%	-1.15%	-1.14%
Construction	\$60 CO ₂	-1.69%	-2.22%	-2.36%	-2.15%	-1.91%	-1.66%	-1.44%	-1.24%	-1.07%
Construction	\$100 CO ₂	-3.56%	-4.87%	-5.31%	-5.19%	-4.88%	-4.50%	-4.14%	-3.77%	-3.48%
Manufacturing	\$30 CO ₂	-0.45%	-0.59%	-0.69%	-0.73%	-0.76%	-0.78%	-0.80%	-0.84%	-0.87%
Manufacturing	\$60 CO ₂	-0.69%	-0.92%	-1.09%	-1.16%	-1.22%	-1.26%	-1.27%	-1.27%	-1.26%
Manufacturing	\$100 CO ₂	-1.19%	-1.61%	-1.90%	-2.09%	-2.21%	-2.30%	-2.36%	-2.39%	-2.42%

Wholesale Trade	\$30 CO ₂	-0.77%	-0.91%	-1.03%	-1.07%	-1.11%	-1.13%	-1.14%	-1.18%	-1.21%
Wholesale Trade	\$60 CO ₂	-1.18%	-1.42%	-1.62%	-1.70%	-1.77%	-1.81%	-1.80%	-1.79%	-1.76%
Wholesale Trade	\$100 CO ₂	-2.04%	-2.48%	-2.80%	-2.99%	-3.12%	-3.19%	-3.22%	-3.21%	-3.21%
Retail Trade	\$30 CO ₂	-1.22%	-1.20%	-1.25%	-1.18%	-1.17%	-1.14%	-1.14%	-1.20%	-1.25%
Retail Trade	\$60 CO ₂	-1.78%	-1.76%	-1.83%	-1.75%	-1.75%	-1.73%	-1.69%	-1.65%	-1.63%
Retail Trade	\$100 CO ₂	-3.25%	-3.35%	-3.51%	-3.53%	-3.56%	-3.57%	-3.55%	-3.51%	-3.53%
Transp, Warehousing	\$30 CO ₂	-0.56%	-0.67%	-0.77%	-0.80%	-0.84%	-0.85%	-0.88%	-0.91%	-0.95%
Transp, Warehousing	\$60 CO ₂	-0.83%	-1.02%	-1.19%	-1.26%	-1.34%	-1.38%	-1.41%	-1.42%	-1.43%
Transp, Warehousing	\$100 CO ₂	-1.50%	-1.85%	-2.13%	-2.31%	-2.44%	-2.53%	-2.60%	-2.63%	-2.66%
Information	\$30 CO ₂	-0.85%	-0.89%	-0.96%	-0.93%	-0.95%	-0.95%	-0.96%	-1.00%	-1.06%
Information	\$60 CO ₂	-1.11%	-1.18%	-1.30%	-1.28%	-1.32%	-1.34%	-1.33%	-1.32%	-1.31%
Information	\$100 CO ₂	-2.29%	-2.47%	-2.69%	-2.78%	-2.86%	-2.92%	-2.94%	-2.94%	-2.96%
Finance, Insurance	\$30 CO ₂	-0.91%	-0.94%	-1.01%	-0.97%	-0.97%	-0.96%	-0.98%	-1.03%	-1.08%
Finance, Insurance	\$60 CO ₂	-1.28%	-1.32%	-1.42%	-1.38%	-1.40%	-1.41%	-1.39%	-1.38%	-1.38%
Finance, Insurance	\$100 CO ₂	-2.42%	-2.60%	-2.81%	-2.88%	-2.94%	-2.99%	-3.01%	-3.02%	-3.06%
Real Estate and Leasing	\$30 CO ₂	-1.33%	-1.26%	-1.29%	-1.18%	-1.15%	-1.11%	-1.10%	-1.15%	-1.19%
Real Estate and Leasing	\$60 CO ₂	-1.86%	-1.76%	-1.81%	-1.69%	-1.67%	-1.63%	-1.56%	-1.51%	-1.47%

Real Estate and Leasing	\$100 CO ₂	-3.50%	-3.49%	-3.61%	-3.56%	-3.54%	-3.50%	-3.42%	-3.34%	-3.32%
Profess, Tech Services	\$30 CO ₂	-0.44%	-0.50%	-0.55%	-0.52%	-0.51%	-0.49%	-0.51%	-0.56%	-0.61%
Profess, Tech Services	\$60 CO ₂	-0.48%	-0.56%	-0.63%	-0.59%	-0.58%	-0.55%	-0.58%	-0.60%	-0.61%
Profess, Tech Services	\$100 CO ₂	-1.16%	-1.42%	-1.64%	-1.73%	-1.79%	-1.83%	-1.92%	-1.99%	-2.06%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.68%	-0.80%	-0.90%	-0.91%	-0.94%	-0.95%	-0.97%	-1.02%	-1.06%
Mngmt of Companies, Enterprises	\$60 CO ₂	-1.02%	-1.21%	-1.38%	-1.43%	-1.49%	-1.53%	-1.53%	-1.53%	-1.53%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.79%	-2.18%	-2.48%	-2.65%	-2.78%	-2.87%	-2.93%	-2.96%	-3.01%
Admin, Waste Services	\$30 CO ₂	-0.63%	-0.69%	-0.75%	-0.74%	-0.74%	-0.74%	-0.75%	-0.80%	-0.84%
Admin, Waste Services	\$60 CO ₂	-0.87%	-0.97%	-1.08%	-1.07%	-1.10%	-1.11%	-1.11%	-1.11%	-1.11%
Admin, Waste Services	\$100 CO ₂	-1.67%	-1.91%	-2.12%	-2.22%	-2.29%	-2.34%	-2.38%	-2.40%	-2.44%
Educational Services	\$30 CO ₂	-1.18%	-1.12%	-1.15%	-1.07%	-1.06%	-1.04%	-1.05%	-1.11%	-1.16%
Educational Services	\$60 CO ₂	-1.68%	-1.60%	-1.66%	-1.58%	-1.58%	-1.58%	-1.54%	-1.52%	-1.50%
Educational Services	\$100 CO ₂	-3.13%	-3.12%	-3.24%	-3.24%	-3.27%	-3.29%	-3.28%	-3.26%	-3.29%
Health Care, Social Asst	\$30 CO ₂	-0.72%	-0.71%	-0.76%	-0.74%	-0.76%	-0.78%	-0.80%	-0.86%	-0.91%
Health Care, Social Asst	\$60 CO ₂	-1.00%	-0.99%	-1.07%	-1.05%	-1.09%	-1.12%	-1.14%	-1.15%	-1.17%
Health Care, Social Asst	\$100 CO ₂	-1.94%	-2.01%	-2.16%	-2.24%	-2.33%	-2.42%	-2.48%	-2.53%	-2.60%

Arts, Entertainment, Rec	\$30 CO ₂	-1.13%	-1.09%	-1.14%	-1.06%	-1.05%	-1.03%	-1.03%	-1.09%	-1.14%
Arts, Entertainment, Rec	\$60 CO ₂	-1.61%	-1.56%	-1.63%	-1.55%	-1.55%	-1.54%	-1.50%	-1.48%	-1.46%
Arts, Entertainment, Rec	\$100 CO ₂	-3.01%	-3.04%	-3.19%	-3.20%	-3.22%	-3.24%	-3.22%	-3.20%	-3.22%
Accommodation, Food Services	\$30 CO ₂	-1.17%	-1.12%	-1.15%	-1.07%	-1.06%	-1.04%	-1.04%	-1.11%	-1.15%
Accommodation, Food Services	\$60 CO ₂	-1.71%	-1.64%	-1.70%	-1.62%	-1.63%	-1.62%	-1.57%	-1.55%	-1.53%
Accommodation, Food Services	\$100 CO ₂	-3.10%	-3.10%	-3.23%	-3.23%	-3.26%	-3.28%	-3.26%	-3.23%	-3.25%
Other Services (excl Gov)	\$30 CO ₂	-1.08%	-1.06%	-1.12%	-1.06%	-1.07%	-1.06%	-1.07%	-1.13%	-1.18%
Other Services (excl Gov)	\$60 CO ₂	-1.49%	-1.48%	-1.57%	-1.51%	-1.54%	-1.55%	-1.53%	-1.52%	-1.51%
Other Services (excl Gov)	\$100 CO ₂	-2.89%	-2.97%	-3.15%	-3.20%	-3.26%	-3.31%	-3.32%	-3.31%	-3.35%

Table A11: Change in Gross State Product, Scenario 3: 50% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.24%	-0.29%	-0.33%	-0.34%	-0.36%	-0.37%	-0.38%	-0.41%	-0.43%
Forestry, Fishing, Other	\$60 CO ₂	-0.40%	-0.51%	-0.60%	-0.64%	-0.69%	-0.72%	-0.73%	-0.74%	-0.75%
Forestry, Fishing, Other	\$100 CO ₂	-0.61%	-0.78%	-0.93%	-1.01%	-1.08%	-1.13%	-1.17%	-1.20%	-1.23%
Mining	\$30 CO ₂	-0.28%	-0.41%	-0.50%	-0.53%	-0.55%	-0.55%	-0.56%	-0.59%	-0.61%
Mining	\$60 CO ₂	-0.48%	-0.73%	-0.91%	-0.99%	-1.05%	-1.08%	-1.09%	-1.09%	-1.09%
Mining	\$100 CO ₂	-0.74%	-1.12%	-1.39%	-1.54%	-1.65%	-1.72%	-1.76%	-1.79%	-1.81%
Utilities	\$30 CO ₂	-1.21%	-1.42%	-1.66%	-1.67%	-1.76%	-1.82%	-1.86%	-1.92%	-2.01%
Utilities	\$60 CO ₂	-1.83%	-2.25%	-2.66%	-2.77%	-2.94%	-3.05%	-3.09%	-3.11%	-3.11%
Utilities	\$100 CO ₂	-3.18%	-3.74%	-4.25%	-4.48%	-4.65%	-4.78%	-4.80%	-4.76%	-4.77%
Construction	\$30 CO ₂	-1.10%	-1.49%	-1.65%	-1.55%	-1.46%	-1.35%	-1.27%	-1.27%	-1.30%
Construction	\$60 CO ₂	-1.70%	-2.39%	-2.70%	-2.66%	-2.58%	-2.47%	-2.32%	-2.17%	-2.04%
Construction	\$100 CO ₂	-2.90%	-4.11%	-4.62%	-4.67%	-4.58%	-4.42%	-4.20%	-3.95%	-3.77%
Manufacturing	\$30 CO ₂	-0.43%	-0.57%	-0.68%	-0.73%	-0.78%	-0.81%	-0.83%	-0.88%	-0.92%
Manufacturing	\$60 CO ₂	-0.73%	-1.01%	-1.23%	-1.35%	-1.45%	-1.52%	-1.56%	-1.58%	-1.60%
Manufacturing	\$100 CO ₂	-1.11%	-1.54%	-1.86%	-2.06%	-2.22%	-2.33%	-2.41%	-2.46%	-2.50%

Wholesale Trade	\$30 CO ₂	-0.65%	-0.80%	-0.93%	-0.98%	-1.04%	-1.07%	-1.10%	-1.15%	-1.20%
Wholesale Trade	\$60 CO ₂	-1.10%	-1.40%	-1.66%	-1.79%	-1.91%	-1.99%	-2.02%	-2.04%	-2.05%
Wholesale Trade	\$100 CO ₂	-1.71%	-2.16%	-2.52%	-2.75%	-2.92%	-3.03%	-3.09%	-3.12%	-3.15%
Retail Trade	\$30 CO ₂	-0.98%	-0.97%	-1.03%	-0.98%	-0.99%	-0.98%	-0.99%	-1.06%	-1.12%
Retail Trade	\$60 CO ₂	-1.59%	-1.64%	-1.78%	-1.75%	-1.80%	-1.84%	-1.83%	-1.82%	-1.83%
Retail Trade	\$100 CO ₂	-2.59%	-2.71%	-2.92%	-2.99%	-3.08%	-3.15%	-3.18%	-3.18%	-3.24%
Transp, Warehousing	\$30 CO ₂	-0.47%	-0.58%	-0.69%	-0.73%	-0.78%	-0.81%	-0.84%	-0.89%	-0.93%
Transp, Warehousing	\$60 CO ₂	-0.77%	-1.01%	-1.21%	-1.32%	-1.42%	-1.50%	-1.54%	-1.58%	-1.60%
Transp, Warehousing	\$100 CO ₂	-1.25%	-1.62%	-1.93%	-2.13%	-2.29%	-2.42%	-2.50%	-2.56%	-2.61%
Information	\$30 CO ₂	-0.72%	-0.76%	-0.85%	-0.83%	-0.86%	-0.88%	-0.91%	-0.96%	-1.03%
Information	\$60 CO ₂	-1.10%	-1.24%	-1.41%	-1.45%	-1.53%	-1.60%	-1.63%	-1.65%	-1.67%
Information	\$100 CO ₂	-1.90%	-2.10%	-2.35%	-2.48%	-2.60%	-2.71%	-2.77%	-2.80%	-2.87%
Finance, Insurance	\$30 CO ₂	-0.75%	-0.80%	-0.88%	-0.86%	-0.89%	-0.90%	-0.92%	-0.99%	-1.05%
Finance, Insurance	\$60 CO ₂	-1.22%	-1.35%	-1.53%	-1.56%	-1.64%	-1.69%	-1.70%	-1.72%	-1.73%
Finance, Insurance	\$100 CO ₂	-1.97%	-2.19%	-2.45%	-2.58%	-2.70%	-2.79%	-2.84%	-2.88%	-2.94%
Real Estate and Leasing	\$30 CO ₂	-1.10%	-1.04%	-1.09%	-1.00%	-1.00%	-0.98%	-0.98%	-1.05%	-1.10%
Real Estate and Leasing	\$60 CO ₂	-1.79%	-1.76%	-1.88%	-1.82%	-1.85%	-1.86%	-1.81%	-1.79%	-1.77%

Real Estate and Leasing	\$100 CO ₂	-2.85%	-2.88%	-3.05%	-3.07%	-3.11%	-3.14%	-3.12%	-3.08%	-3.10%
Profess, Tech Services	\$30 CO ₂	-0.56%	-0.66%	-0.77%	-0.78%	-0.82%	-0.84%	-0.87%	-0.93%	-0.98%
Profess, Tech Services	\$60 CO ₂	-0.89%	-1.11%	-1.32%	-1.40%	-1.50%	-1.57%	-1.60%	-1.63%	-1.65%
Profess, Tech Services	\$100 CO ₂	-1.45%	-1.81%	-2.12%	-2.30%	-2.45%	-2.57%	-2.65%	-2.70%	-2.76%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.60%	-0.73%	-0.84%	-0.87%	-0.91%	-0.93%	-0.96%	-1.02%	-1.07%
Mngmt of Companies, Enterprises	\$60 CO ₂	-1.00%	-1.26%	-1.49%	-1.59%	-1.69%	-1.77%	-1.80%	-1.82%	-1.84%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.56%	-1.97%	-2.30%	-2.50%	-2.67%	-2.79%	-2.87%	-2.93%	-2.99%
Admin, Waste Services	\$30 CO ₂	-0.54%	-0.61%	-0.69%	-0.69%	-0.71%	-0.72%	-0.74%	-0.79%	-0.84%
Admin, Waste Services	\$60 CO ₂	-0.86%	-1.02%	-1.19%	-1.24%	-1.31%	-1.36%	-1.38%	-1.39%	-1.41%
Admin, Waste Services	\$100 CO ₂	-1.41%	-1.67%	-1.93%	-2.06%	-2.18%	-2.27%	-2.32%	-2.36%	-2.41%
Educational Services	\$30 CO ₂	-0.90%	-0.85%	-0.91%	-0.84%	-0.86%	-0.86%	-0.88%	-0.95%	-1.02%
Educational Services	\$60 CO ₂	-1.43%	-1.42%	-1.55%	-1.52%	-1.58%	-1.62%	-1.61%	-1.63%	-1.64%
Educational Services	\$100 CO ₂	-2.35%	-2.39%	-2.58%	-2.65%	-2.74%	-2.83%	-2.87%	-2.89%	-2.96%
Health Care, Social Asst	\$30 CO ₂	-0.57%	-0.56%	-0.61%	-0.59%	-0.62%	-0.64%	-0.66%	-0.72%	-0.78%
Health Care, Social Asst	\$60 CO ₂	-0.90%	-0.92%	-1.02%	-1.03%	-1.09%	-1.15%	-1.18%	-1.21%	-1.24%
Health Care, Social Asst	\$100 CO ₂	-1.53%	-1.59%	-1.75%	-1.84%	-1.95%	-2.06%	-2.13%	-2.19%	-2.28%

Arts, Entertainment, Rec	\$30 CO ₂	-0.87%	-0.85%	-0.91%	-0.86%	-0.87%	-0.87%	-0.89%	-0.96%	-1.02%
Arts, Entertainment, Rec	\$60 CO ₂	-1.39%	-1.42%	-1.56%	-1.54%	-1.60%	-1.64%	-1.64%	-1.64%	-1.65%
Arts, Entertainment, Rec	\$100 CO ₂	-2.29%	-2.38%	-2.59%	-2.66%	-2.76%	-2.84%	-2.87%	-2.88%	-2.94%
Accommodation, Food Services	\$30 CO ₂	-0.93%	-0.89%	-0.94%	-0.88%	-0.89%	-0.89%	-0.91%	-0.98%	-1.04%
Accommodation, Food Services	\$60 CO ₂	-1.51%	-1.51%	-1.64%	-1.61%	-1.67%	-1.70%	-1.69%	-1.69%	-1.69%
Accommodation, Food Services	\$100 CO ₂	-2.43%	-2.48%	-2.67%	-2.74%	-2.82%	-2.90%	-2.92%	-2.93%	-2.99%
Other Services (excl Gov)	\$30 CO ₂	-0.85%	-0.84%	-0.91%	-0.86%	-0.88%	-0.89%	-0.91%	-0.98%	-1.05%
Other Services (excl Gov)	\$60 CO ₂	-1.34%	-1.38%	-1.53%	-1.52%	-1.59%	-1.64%	-1.65%	-1.67%	-1.68%
Other Services (excl Gov)	\$100 CO ₂	-2.26%	-2.36%	-2.58%	-2.68%	-2.79%	-2.89%	-2.93%	-2.96%	-3.03%

Table A12: Change in Gross State Product, Scenario 4: 95% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.20%	-0.26%	-0.30%	-0.32%	-0.33%	-0.34%	-0.35%	-0.38%	-0.40%
Forestry, Fishing, Other	\$60 CO ₂	-0.33%	-0.45%	-0.54%	-0.59%	-0.64%	-0.67%	-0.68%	-0.69%	-0.70%
Forestry, Fishing, Other	\$100 CO ₂	-0.52%	-0.70%	-0.85%	-0.94%	-1.02%	-1.08%	-1.12%	-1.14%	-1.18%
Mining	\$30 CO ₂	-0.26%	-0.39%	-0.48%	-0.50%	-0.52%	-0.53%	-0.53%	-0.56%	-0.59%
Mining	\$60 CO ₂	-0.44%	-0.68%	-0.86%	-0.93%	-1.00%	-1.04%	-1.05%	-1.05%	-1.05%
Mining	\$100 CO ₂	-0.67%	-1.05%	-1.33%	-1.48%	-1.59%	-1.67%	-1.71%	-1.74%	-1.76%
Utilities	\$30 CO ₂	-1.02%	-1.20%	-1.43%	-1.43%	-1.52%	-1.58%	-1.62%	-1.68%	-1.77%
Utilities	\$60 CO ₂	-1.46%	-1.84%	-2.23%	-2.34%	-2.50%	-2.61%	-2.65%	-2.67%	-2.68%
Utilities	\$100 CO ₂	-2.67%	-3.18%	-3.69%	-3.92%	-4.10%	-4.24%	-4.27%	-4.25%	-4.26%
Construction	\$30 CO ₂	-0.71%	-0.99%	-1.11%	-1.01%	-0.92%	-0.84%	-0.78%	-0.80%	-0.85%
Construction	\$60 CO ₂	-0.95%	-1.45%	-1.70%	-1.65%	-1.59%	-1.53%	-1.43%	-1.34%	-1.26%
Construction	\$100 CO ₂	-1.87%	-2.84%	-3.29%	-3.37%	-3.34%	-3.28%	-3.15%	-2.99%	-2.89%
Manufacturing	\$30 CO ₂	-0.36%	-0.51%	-0.62%	-0.67%	-0.71%	-0.74%	-0.76%	-0.80%	-0.84%
Manufacturing	\$60 CO ₂	-0.60%	-0.88%	-1.10%	-1.22%	-1.32%	-1.39%	-1.43%	-1.45%	-1.46%
Manufacturing	\$100 CO ₂	-0.94%	-1.37%	-1.69%	-1.90%	-2.06%	-2.18%	-2.25%	-2.30%	-2.35%

Wholesale Trade	\$30 CO ₂	-0.51%	-0.65%	-0.78%	-0.83%	-0.89%	-0.92%	-0.95%	-1.00%	-1.04%
Wholesale Trade	\$60 CO ₂	-0.83%	-1.12%	-1.38%	-1.51%	-1.63%	-1.71%	-1.74%	-1.76%	-1.77%
Wholesale Trade	\$100 CO ₂	-1.34%	-1.79%	-2.16%	-2.39%	-2.57%	-2.69%	-2.76%	-2.79%	-2.83%
Retail Trade	\$30 CO ₂	-0.71%	-0.69%	-0.74%	-0.68%	-0.69%	-0.69%	-0.70%	-0.77%	-0.83%
Retail Trade	\$60 CO ₂	-1.08%	-1.10%	-1.23%	-1.21%	-1.26%	-1.30%	-1.30%	-1.30%	-1.31%
Retail Trade	\$100 CO ₂	-1.89%	-1.99%	-2.21%	-2.30%	-2.41%	-2.50%	-2.55%	-2.57%	-2.64%
Transp, Warehousing	\$30 CO ₂	-0.36%	-0.47%	-0.58%	-0.61%	-0.66%	-0.70%	-0.73%	-0.77%	-0.81%
Transp, Warehousing	\$60 CO ₂	-0.57%	-0.79%	-1.00%	-1.10%	-1.21%	-1.29%	-1.33%	-1.37%	-1.39%
Transp, Warehousing	\$100 CO ₂	-0.97%	-1.33%	-1.64%	-1.85%	-2.03%	-2.16%	-2.25%	-2.31%	-2.37%
Information	\$30 CO ₂	-0.55%	-0.58%	-0.67%	-0.64%	-0.67%	-0.69%	-0.72%	-0.77%	-0.84%
Information	\$60 CO ₂	-0.78%	-0.90%	-1.07%	-1.11%	-1.19%	-1.26%	-1.29%	-1.32%	-1.34%
Information	\$100 CO ₂	-1.46%	-1.65%	-1.91%	-2.04%	-2.17%	-2.29%	-2.36%	-2.40%	-2.47%
Finance, Insurance	\$30 CO ₂	-0.55%	-0.60%	-0.68%	-0.67%	-0.69%	-0.71%	-0.73%	-0.80%	-0.86%
Finance, Insurance	\$60 CO ₂	-0.84%	-0.97%	-1.16%	-1.20%	-1.29%	-1.35%	-1.37%	-1.39%	-1.40%
Finance, Insurance	\$100 CO ₂	-1.44%	-1.68%	-1.97%	-2.12%	-2.26%	-2.38%	-2.44%	-2.49%	-2.56%
Real Estate and Leasing	\$30 CO ₂	-0.84%	-0.77%	-0.82%	-0.73%	-0.73%	-0.72%	-0.73%	-0.80%	-0.86%
Real Estate and Leasing	\$60 CO ₂	-1.29%	-1.26%	-1.38%	-1.32%	-1.37%	-1.39%	-1.36%	-1.35%	-1.35%

Real Estate and Leasing	\$100 CO ₂	-2.17%	-2.19%	-2.39%	-2.44%	-2.51%	-2.57%	-2.58%	-2.57%	-2.61%
Profess, Tech Services	\$30 CO ₂	-0.38%	-0.47%	-0.57%	-0.59%	-0.63%	-0.65%	-0.68%	-0.74%	-0.79%
Profess, Tech Services	\$60 CO ₂	-0.55%	-0.76%	-0.96%	-1.04%	-1.14%	-1.22%	-1.25%	-1.29%	-1.31%
Profess, Tech Services	\$100 CO ₂	-0.98%	-1.33%	-1.65%	-1.84%	-2.01%	-2.14%	-2.23%	-2.29%	-2.37%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.48%	-0.61%	-0.73%	-0.76%	-0.80%	-0.82%	-0.85%	-0.90%	-0.95%
Mngmt of Companies, Enterprises	\$60 CO ₂	-0.78%	-1.05%	-1.28%	-1.38%	-1.49%	-1.56%	-1.60%	-1.62%	-1.64%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.27%	-1.68%	-2.03%	-2.24%	-2.41%	-2.55%	-2.63%	-2.69%	-2.75%
Admin, Waste Services	\$30 CO ₂	-0.38%	-0.45%	-0.52%	-0.52%	-0.55%	-0.56%	-0.58%	-0.63%	-0.68%
Admin, Waste Services	\$60 CO ₂	-0.57%	-0.72%	-0.88%	-0.93%	-1.01%	-1.06%	-1.08%	-1.11%	-1.12%
Admin, Waste Services	\$100 CO ₂	-1.00%	-1.26%	-1.52%	-1.67%	-1.80%	-1.91%	-1.97%	-2.02%	-2.08%
Educational Services	\$30 CO ₂	-0.59%	-0.54%	-0.59%	-0.53%	-0.55%	-0.55%	-0.58%	-0.65%	-0.72%
Educational Services	\$60 CO ₂	-0.84%	-0.83%	-0.96%	-0.95%	-1.02%	-1.07%	-1.08%	-1.10%	-1.12%
Educational Services	\$100 CO ₂	-1.54%	-1.59%	-1.82%	-1.92%	-2.05%	-2.16%	-2.23%	-2.28%	-2.37%
Health Care, Social Asst	\$30 CO ₂	-0.41%	-0.39%	-0.43%	-0.40%	-0.42%	-0.43%	-0.45%	-0.50%	-0.55%
Health Care, Social Asst	\$60 CO ₂	-0.59%	-0.59%	-0.67%	-0.67%	-0.72%	-0.77%	-0.79%	-0.81%	-0.84%
Health Care, Social Asst	\$100 CO ₂	-1.11%	-1.14%	-1.29%	-1.38%	-1.48%	-1.58%	-1.66%	-1.71%	-1.80%

Arts, Entertainment, Rec	\$30 CO ₂	-0.58%	-0.55%	-0.61%	-0.56%	-0.58%	-0.58%	-0.60%	-0.68%	-0.74%
Arts, Entertainment, Rec	\$60 CO ₂	-0.83%	-0.85%	-1.00%	-0.99%	-1.07%	-1.12%	-1.13%	-1.14%	-1.16%
Arts, Entertainment, Rec	\$100 CO ₂	-1.52%	-1.62%	-1.86%	-1.97%	-2.09%	-2.20%	-2.26%	-2.30%	-2.38%
Accommodation, Food Services	\$30 CO ₂	-0.66%	-0.62%	-0.68%	-0.62%	-0.63%	-0.63%	-0.65%	-0.73%	-0.79%
Accommodation, Food Services	\$60 CO ₂	-1.00%	-1.00%	-1.14%	-1.12%	-1.19%	-1.24%	-1.23%	-1.25%	-1.26%
Accommodation, Food Services	\$100 CO ₂	-1.73%	-1.79%	-2.02%	-2.11%	-2.23%	-2.33%	-2.38%	-2.41%	-2.49%
Other Services (excl Gov)	\$30 CO ₂	-0.60%	-0.58%	-0.64%	-0.58%	-0.60%	-0.61%	-0.63%	-0.70%	-0.77%
Other Services (excl Gov)	\$60 CO ₂	-0.85%	-0.88%	-1.02%	-1.01%	-1.08%	-1.13%	-1.15%	-1.17%	-1.19%
Other Services (excl Gov)	\$100 CO ₂	-1.59%	-1.68%	-1.91%	-2.02%	-2.14%	-2.26%	-2.33%	-2.37%	-2.46%

Table A13: Change in Employment, Scenario 1: No Distribution of Allowances

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.21%	-0.23%	-0.25%	-0.24%	-0.24%	-0.24%	-0.25%	-0.26%	-0.28%
Forestry, Fishing, Other	\$60 CO ₂	-0.37%	-0.41%	-0.46%	-0.46%	-0.47%	-0.48%	-0.47%	-0.47%	-0.47%
Forestry, Fishing, Other	\$100 CO ₂	-0.55%	-0.63%	-0.69%	-0.71%	-0.73%	-0.74%	-0.75%	-0.75%	-0.77%
Mining	\$30 CO ₂	-0.15%	-0.17%	-0.17%	-0.14%	-0.11%	-0.08%	-0.05%	-0.03%	-0.02%
Mining	\$60 CO ₂	-0.25%	-0.30%	-0.31%	-0.27%	-0.22%	-0.16%	-0.09%	-0.03%	0.03%
Mining	\$100 CO ₂	-0.39%	-0.47%	-0.49%	-0.43%	-0.35%	-0.26%	-0.15%	-0.05%	0.05%
Utilities	\$30 CO ₂	-1.34%	-1.52%	-1.73%	-1.73%	-1.81%	-1.86%	-1.89%	-1.95%	-2.03%
Utilities	\$60 CO ₂	-2.18%	-2.59%	-2.98%	-3.08%	-3.23%	-3.32%	-3.35%	-3.35%	-3.34%
Utilities	\$100 CO ₂	-3.64%	-4.18%	-4.66%	-4.85%	-4.99%	-5.08%	-5.07%	-5.01%	-4.99%
Construction	\$30 CO ₂	-1.41%	-1.83%	-1.96%	-1.83%	-1.69%	-1.54%	-1.42%	-1.37%	-1.36%
Construction	\$60 CO ₂	-2.37%	-3.13%	-3.41%	-3.29%	-3.10%	-2.88%	-2.63%	-2.38%	-2.17%
Construction	\$100 CO ₂	-3.80%	-5.07%	-5.47%	-5.36%	-5.08%	-4.73%	-4.32%	-3.90%	-3.56%
Manufacturing	\$30 CO ₂	-0.62%	-0.74%	-0.84%	-0.85%	-0.88%	-0.89%	-0.90%	-0.94%	-0.98%
Manufacturing	\$60 CO ₂	-1.07%	-1.33%	-1.52%	-1.59%	-1.66%	-1.70%	-1.71%	-1.71%	-1.70%
Manufacturing	\$100 CO ₂	-1.63%	-2.02%	-2.30%	-2.45%	-2.55%	-2.62%	-2.65%	-2.66%	-2.68%

Wholesale Trade	\$30 CO ₂	-0.77%	-0.89%	-1.01%	-1.04%	-1.09%	-1.11%	-1.14%	-1.18%	-1.22%
Wholesale Trade	\$60 CO ₂	-1.34%	-1.61%	-1.83%	-1.93%	-2.03%	-2.09%	-2.11%	-2.11%	-2.11%
Wholesale Trade	\$100 CO ₂	-2.04%	-2.43%	-2.72%	-2.90%	-3.02%	-3.10%	-3.13%	-3.13%	-3.14%
Retail Trade	\$30 CO ₂	-1.21%	-1.18%	-1.22%	-1.14%	-1.14%	-1.12%	-1.12%	-1.18%	-1.23%
Retail Trade	\$60 CO ₂	-2.07%	-2.07%	-2.17%	-2.11%	-2.12%	-2.12%	-2.08%	-2.05%	-2.03%
Retail Trade	\$100 CO ₂	-3.24%	-3.28%	-3.40%	-3.39%	-3.41%	-3.41%	-3.37%	-3.33%	-3.33%
Transp, Warehousing	\$30 CO ₂	-0.50%	-0.52%	-0.54%	-0.50%	-0.48%	-0.45%	-0.43%	-0.42%	-0.43%
Transp, Warehousing	\$60 CO ₂	-0.85%	-0.91%	-0.96%	-0.92%	-0.90%	-0.86%	-0.80%	-0.75%	-0.69%
Transp, Warehousing	\$100 CO ₂	-1.34%	-1.44%	-1.51%	-1.49%	-1.45%	-1.40%	-1.33%	-1.24%	-1.18%
Information	\$30 CO ₂	-0.85%	-0.88%	-0.96%	-0.93%	-0.96%	-0.97%	-0.99%	-1.04%	-1.10%
Information	\$60 CO ₂	-1.42%	-1.53%	-1.68%	-1.70%	-1.77%	-1.81%	-1.83%	-1.84%	-1.85%
Information	\$100 CO ₂	-2.28%	-2.45%	-2.65%	-2.74%	-2.83%	-2.91%	-2.94%	-2.95%	-2.99%
Finance, Insurance	\$30 CO ₂	-0.95%	-0.97%	-1.03%	-0.99%	-1.00%	-1.00%	-1.02%	-1.08%	-1.14%
Finance, Insurance	\$60 CO ₂	-1.62%	-1.71%	-1.85%	-1.85%	-1.89%	-1.92%	-1.92%	-1.92%	-1.93%
Finance, Insurance	\$100 CO ₂	-2.51%	-2.67%	-2.86%	-2.92%	-2.99%	-3.04%	-3.07%	-3.08%	-3.13%
Real Estate and Leasing	\$30 CO ₂	-1.37%	-1.27%	-1.28%	-1.17%	-1.13%	-1.09%	-1.08%	-1.14%	-1.17%
Real Estate and Leasing	\$60 CO ₂	-2.35%	-2.24%	-2.30%	-2.18%	-2.15%	-2.11%	-2.02%	-1.96%	-1.91%

Real Estate and Leasing	\$100 CO ₂	-3.62%	-3.53%	-3.60%	-3.51%	-3.46%	-3.40%	-3.30%	-3.20%	-3.17%
Profess, Tech Services	\$30 CO ₂	-0.72%	-0.81%	-0.90%	-0.90%	-0.93%	-0.94%	-0.96%	-1.01%	-1.06%
Profess, Tech Services	\$60 CO ₂	-1.23%	-1.43%	-1.60%	-1.66%	-1.73%	-1.78%	-1.79%	-1.81%	-1.82%
Profess, Tech Services	\$100 CO ₂	-1.90%	-2.22%	-2.47%	-2.61%	-2.71%	-2.79%	-2.83%	-2.85%	-2.89%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.67%	-0.76%	-0.84%	-0.84%	-0.87%	-0.88%	-0.89%	-0.94%	-0.98%
Mngmt of Companies, Enterprises	\$60 CO ₂	-1.16%	-1.35%	-1.52%	-1.58%	-1.64%	-1.68%	-1.69%	-1.69%	-1.70%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.77%	-2.07%	-2.30%	-2.43%	-2.52%	-2.59%	-2.62%	-2.63%	-2.66%
Admin, Waste Services	\$30 CO ₂	-0.65%	-0.69%	-0.74%	-0.72%	-0.73%	-0.73%	-0.74%	-0.78%	-0.82%
Admin, Waste Services	\$60 CO ₂	-1.10%	-1.21%	-1.33%	-1.34%	-1.37%	-1.39%	-1.38%	-1.38%	-1.38%
Admin, Waste Services	\$100 CO ₂	-1.73%	-1.91%	-2.07%	-2.13%	-2.18%	-2.21%	-2.22%	-2.21%	-2.22%
Educational Services	\$30 CO ₂	-1.18%	-1.10%	-1.13%	-1.05%	-1.04%	-1.03%	-1.04%	-1.10%	-1.15%
Educational Services	\$60 CO ₂	-2.01%	-1.94%	-2.02%	-1.95%	-1.96%	-1.97%	-1.93%	-1.91%	-1.90%
Educational Services	\$100 CO ₂	-3.13%	-3.07%	-3.16%	-3.14%	-3.15%	-3.16%	-3.14%	-3.11%	-3.13%
Health Care, Social Asst	\$30 CO ₂	-0.82%	-0.78%	-0.82%	-0.78%	-0.80%	-0.81%	-0.84%	-0.89%	-0.94%
Health Care, Social Asst	\$60 CO ₂	-1.38%	-1.36%	-1.45%	-1.43%	-1.47%	-1.51%	-1.52%	-1.54%	-1.56%
Health Care, Social Asst	\$100 CO ₂	-2.22%	-2.21%	-2.32%	-2.36%	-2.43%	-2.49%	-2.52%	-2.55%	-2.60%

Arts, Entertainment, Rec	\$30 CO ₂	-1.10%	-1.04%	-1.07%	-0.99%	-0.99%	-0.97%	-0.97%	-1.03%	-1.07%
Arts, Entertainment, Rec	\$60 CO ₂	-1.87%	-1.83%	-1.91%	-1.84%	-1.85%	-1.85%	-1.81%	-1.78%	-1.77%
Arts, Entertainment, Rec	\$100 CO ₂	-2.93%	-2.90%	-2.99%	-2.97%	-2.98%	-2.98%	-2.94%	-2.90%	-2.90%
Accommodation, Food Services	\$30 CO ₂	-1.23%	-1.12%	-1.13%	-1.03%	-1.01%	-0.98%	-0.98%	-1.04%	-1.08%
Accommodation, Food Services	\$60 CO ₂	-2.11%	-1.98%	-2.02%	-1.91%	-1.91%	-1.89%	-1.82%	-1.79%	-1.76%
Accommodation, Food Services	\$100 CO ₂	-3.26%	-3.12%	-3.15%	-3.08%	-3.05%	-3.03%	-2.96%	-2.90%	-2.88%
Other Services (excl Gov)	\$30 CO ₂	-1.28%	-1.19%	-1.23%	-1.13%	-1.14%	-1.14%	-1.15%	-1.21%	-1.29%
Other Services (excl Gov)	\$60 CO ₂	-2.06%	-2.01%	-2.11%	-2.02%	-2.06%	-2.08%	-2.07%	-2.07%	-2.07%
Other Services (excl Gov)	\$100 CO ₂	-3.45%	-3.36%	-3.46%	-3.44%	-3.47%	-3.51%	-3.49%	-3.46%	-3.49%
State & Local Gov	\$30 CO ₂	-0.22%	-0.39%	-0.53%	-0.64%	-0.73%	-0.81%	-0.87%	-0.93%	-1.00%
State & Local Gov	\$60 CO ₂	-0.37%	-0.66%	-0.91%	-1.11%	-1.28%	-1.43%	-1.55%	-1.65%	-1.73%
State & Local Gov	\$100 CO ₂	-0.61%	-1.09%	-1.50%	-1.84%	-2.13%	-2.38%	-2.58%	-2.75%	-2.89%
Total Employment	\$30 CO ₂	-0.87%	-0.92%	-0.98%	-0.95%	-0.95%	-0.95%	-0.95%	-1.00%	-1.04%
Total Employment	\$60 CO ₂	-1.48%	-1.60%	-1.74%	-1.74%	-1.77%	-1.78%	-1.76%	-1.74%	-1.73%
Total Employment	\$100 CO ₂	-2.33%	-2.55%	-2.74%	-2.79%	-2.84%	-2.86%	-2.85%	-2.82%	-2.83%

Table A14: Change in Employment, Scenario 2: 25- 50% of Allowances Allocated to R&D and Deployment of Renewable Technologies

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.21%	-0.23%	-0.24%	-0.24%	-0.24%	-0.24%	-0.24%	-0.26%	-0.27%
Forestry, Fishing, Other	\$60 CO ₂	-0.31%	-0.35%	-0.39%	-0.39%	-0.40%	-0.41%	-0.40%	-0.40%	-0.40%
Forestry, Fishing, Other	\$100 CO ₂	-0.54%	-0.62%	-0.68%	-0.70%	-0.72%	-0.74%	-0.74%	-0.75%	-0.76%
Mining	\$30 CO ₂	-0.14%	-0.15%	-0.14%	-0.08%	-0.04%	0.02%	0.07%	0.11%	0.15%
Mining	\$60 CO ₂	-0.17%	-0.16%	-0.11%	-0.01%	0.09%	0.19%	0.29%	0.39%	0.48%
Mining	\$100 CO ₂	-0.38%	-0.42%	-0.39%	-0.28%	-0.15%	-0.01%	0.14%	0.29%	0.42%
Utilities	\$30 CO ₂	-1.31%	-1.15%	-0.99%	-0.59%	-0.25%	0.15%	0.56%	0.91%	1.21%
Utilities	\$60 CO ₂	-1.25%	-0.63%	-0.03%	0.79%	1.53%	2.30%	3.11%	3.82%	4.46%
Utilities	\$100 CO ₂	-3.57%	-3.22%	-2.73%	-1.95%	-1.11%	-0.23%	0.74%	1.62%	2.35%
Construction	\$30 CO ₂	-1.23%	-1.58%	-1.65%	-1.45%	-1.25%	-1.03%	-0.88%	-0.81%	-0.77%
Construction	\$60 CO ₂	-1.52%	-1.94%	-1.98%	-1.70%	-1.40%	-1.10%	-0.84%	-0.61%	-0.42%
Construction	\$100 CO ₂	-3.32%	-4.44%	-4.71%	-4.46%	-4.04%	-3.57%	-3.13%	-2.69%	-2.34%
Manufacturing	\$30 CO ₂	-0.53%	-0.64%	-0.72%	-0.72%	-0.72%	-0.72%	-0.73%	-0.76%	-0.80%
Manufacturing	\$60 CO ₂	-0.77%	-0.95%	-1.09%	-1.11%	-1.13%	-1.14%	-1.13%	-1.12%	-1.11%
Manufacturing	\$100 CO ₂	-1.39%	-1.76%	-2.01%	-2.13%	-2.21%	-2.25%	-2.28%	-2.29%	-2.31%

Wholesale Trade	\$30 CO ₂	-0.74%	-0.86%	-0.96%	-0.98%	-1.01%	-1.02%	-1.03%	-1.06%	-1.09%
Wholesale Trade	\$60 CO ₂	-1.13%	-1.34%	-1.51%	-1.56%	-1.61%	-1.63%	-1.62%	-1.59%	-1.56%
Wholesale Trade	\$100 CO ₂	-1.96%	-2.34%	-2.61%	-2.75%	-2.85%	-2.89%	-2.89%	-2.87%	-2.85%
Retail Trade	\$30 CO ₂	-1.17%	-1.12%	-1.14%	-1.05%	-1.03%	-0.99%	-0.98%	-1.02%	-1.06%
Retail Trade	\$60 CO ₂	-1.70%	-1.62%	-1.65%	-1.54%	-1.51%	-1.47%	-1.41%	-1.36%	-1.32%
Retail Trade	\$100 CO ₂	-3.12%	-3.13%	-3.21%	-3.17%	-3.14%	-3.11%	-3.05%	-2.99%	-2.97%
Transp, Warehousing	\$30 CO ₂	-0.47%	-0.48%	-0.49%	-0.44%	-0.41%	-0.37%	-0.34%	-0.33%	-0.32%
Transp, Warehousing	\$60 CO ₂	-0.67%	-0.68%	-0.69%	-0.61%	-0.56%	-0.49%	-0.42%	-0.34%	-0.27%
Transp, Warehousing	\$100 CO ₂	-1.27%	-1.35%	-1.40%	-1.36%	-1.30%	-1.22%	-1.13%	-1.03%	-0.95%
Information	\$30 CO ₂	-0.82%	-0.84%	-0.90%	-0.86%	-0.87%	-0.86%	-0.87%	-0.91%	-0.95%
Information	\$60 CO ₂	-1.10%	-1.14%	-1.24%	-1.21%	-1.23%	-1.23%	-1.21%	-1.20%	-1.18%
Information	\$100 CO ₂	-2.19%	-2.33%	-2.50%	-2.56%	-2.62%	-2.66%	-2.66%	-2.65%	-2.66%
Finance, Insurance	\$30 CO ₂	-0.89%	-0.90%	-0.95%	-0.90%	-0.90%	-0.89%	-0.90%	-0.95%	-1.00%
Finance, Insurance	\$60 CO ₂	-1.26%	-1.27%	-1.35%	-1.30%	-1.31%	-1.30%	-1.28%	-1.28%	-1.27%
Finance, Insurance	\$100 CO ₂	-2.37%	-2.51%	-2.67%	-2.71%	-2.75%	-2.78%	-2.80%	-2.80%	-2.84%
Real Estate and Leasing	\$30 CO ₂	-1.33%	-1.21%	-1.21%	-1.08%	-1.03%	-0.97%	-0.94%	-0.99%	-1.02%
Real Estate and Leasing	\$60 CO ₂	-1.86%	-1.69%	-1.69%	-1.53%	-1.48%	-1.42%	-1.32%	-1.26%	-1.20%

Real Estate and Leasing	\$100 CO ₂	-3.50%	-3.38%	-3.42%	-3.30%	-3.21%	-3.12%	-3.00%	-2.88%	-2.83%
Profess, Tech Services	\$30 CO ₂	-0.41%	-0.45%	-0.50%	-0.46%	-0.44%	-0.41%	-0.43%	-0.48%	-0.52%
Profess, Tech Services	\$60 CO ₂	-0.45%	-0.49%	-0.55%	-0.50%	-0.47%	-0.44%	-0.45%	-0.47%	-0.47%
Profess, Tech Services	\$100 CO ₂	-1.10%	-1.31%	-1.49%	-1.55%	-1.58%	-1.60%	-1.68%	-1.73%	-1.79%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.63%	-0.71%	-0.79%	-0.79%	-0.80%	-0.79%	-0.80%	-0.84%	-0.87%
Mngmt of Companies, Enterprises	\$60 CO ₂	-0.94%	-1.08%	-1.20%	-1.22%	-1.24%	-1.25%	-1.24%	-1.22%	-1.20%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.67%	-1.96%	-2.18%	-2.29%	-2.36%	-2.40%	-2.42%	-2.42%	-2.43%
Admin, Waste Services	\$30 CO ₂	-0.58%	-0.60%	-0.65%	-0.61%	-0.61%	-0.59%	-0.60%	-0.63%	-0.66%
Admin, Waste Services	\$60 CO ₂	-0.79%	-0.83%	-0.90%	-0.86%	-0.86%	-0.85%	-0.84%	-0.82%	-0.81%
Admin, Waste Services	\$100 CO ₂	-1.54%	-1.69%	-1.83%	-1.86%	-1.88%	-1.89%	-1.90%	-1.89%	-1.90%
Educational Services	\$30 CO ₂	-1.14%	-1.05%	-1.06%	-0.96%	-0.94%	-0.91%	-0.91%	-0.96%	-1.01%
Educational Services	\$60 CO ₂	-1.61%	-1.49%	-1.51%	-1.40%	-1.38%	-1.36%	-1.30%	-1.27%	-1.25%
Educational Services	\$100 CO ₂	-3.02%	-2.93%	-2.99%	-2.94%	-2.92%	-2.90%	-2.86%	-2.82%	-2.82%
Health Care, Social Asst	\$30 CO ₂	-0.80%	-0.75%	-0.78%	-0.73%	-0.74%	-0.73%	-0.75%	-0.80%	-0.84%
Health Care, Social Asst	\$60 CO ₂	-1.11%	-1.04%	-1.08%	-1.03%	-1.04%	-1.05%	-1.04%	-1.04%	-1.04%
Health Care, Social Asst	\$100 CO ₂	-2.15%	-2.12%	-2.21%	-2.23%	-2.27%	-2.31%	-2.33%	-2.34%	-2.38%

Arts, Entertainment, Rec	\$30 CO ₂	-1.05%	-0.98%	-0.99%	-0.90%	-0.87%	-0.84%	-0.83%	-0.88%	-0.91%
Arts, Entertainment, Rec	\$60 CO ₂	-1.48%	-1.38%	-1.40%	-1.29%	-1.27%	-1.23%	-1.18%	-1.14%	-1.11%
Arts, Entertainment, Rec	\$100 CO ₂	-2.79%	-2.73%	-2.80%	-2.74%	-2.71%	-2.68%	-2.63%	-2.57%	-2.56%
Accommodation, Food Services	\$30 CO ₂	-1.19%	-1.06%	-1.05%	-0.94%	-0.91%	-0.86%	-0.85%	-0.90%	-0.93%
Accommodation, Food Services	\$60 CO ₂	-1.72%	-1.54%	-1.53%	-1.38%	-1.34%	-1.29%	-1.21%	-1.16%	-1.12%
Accommodation, Food Services	\$100 CO ₂	-3.14%	-2.97%	-2.97%	-2.87%	-2.81%	-2.75%	-2.67%	-2.59%	-2.56%
Other Services (excl Gov)	\$30 CO ₂	-1.24%	-1.14%	-1.17%	-1.05%	-1.04%	-1.03%	-1.03%	-1.08%	-1.15%
Other Services (excl Gov)	\$60 CO ₂	-1.58%	-1.46%	-1.52%	-1.39%	-1.40%	-1.39%	-1.36%	-1.35%	-1.33%
Other Services (excl Gov)	\$100 CO ₂	-3.35%	-3.23%	-3.30%	-3.26%	-3.25%	-3.26%	-3.22%	-3.17%	-3.19%
State & Local Gov	\$30 CO ₂	-0.21%	-0.37%	-0.50%	-0.59%	-0.66%	-0.72%	-0.76%	-0.81%	-0.85%
State & Local Gov	\$60 CO ₂	-0.29%	-0.49%	-0.67%	-0.79%	-0.89%	-0.97%	-1.03%	-1.07%	-1.11%
State & Local Gov	\$100 CO ₂	-0.59%	-1.03%	-1.41%	-1.71%	-1.96%	-2.16%	-2.33%	-2.45%	-2.56%
Total Employment	\$30 CO ₂	-0.80%	-0.83%	-0.87%	-0.82%	-0.80%	-0.77%	-0.76%	-0.80%	-0.83%
Total Employment	\$60 CO ₂	-1.11%	-1.14%	-1.20%	-1.13%	-1.11%	-1.07%	-1.03%	-1.00%	-0.97%
Total Employment	\$100 CO ₂	-2.15%	-2.32%	-2.47%	-2.48%	-2.48%	-2.46%	-2.43%	-2.39%	-2.38%

Table A15: Change in Employment, Scenario 3: 50% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.18%	-0.20%	-0.23%	-0.22%	-0.22%	-0.23%	-0.23%	-0.24%	-0.26%
Forestry, Fishing, Other	\$60 CO ₂	-0.30%	-0.36%	-0.41%	-0.42%	-0.43%	-0.44%	-0.44%	-0.43%	-0.43%
Forestry, Fishing, Other	\$100 CO ₂	-0.46%	-0.55%	-0.63%	-0.66%	-0.68%	-0.70%	-0.71%	-0.71%	-0.72%
Mining	\$30 CO ₂	-0.12%	-0.15%	-0.15%	-0.12%	-0.09%	-0.06%	-0.03%	-0.01%	0.01%
Mining	\$60 CO ₂	-0.20%	-0.24%	-0.25%	-0.21%	-0.16%	-0.10%	-0.04%	0.03%	0.09%
Mining	\$100 CO ₂	-0.32%	-0.40%	-0.41%	-0.36%	-0.28%	-0.19%	-0.08%	0.02%	0.12%
Utilities	\$30 CO ₂	-1.18%	-1.36%	-1.57%	-1.57%	-1.66%	-1.70%	-1.74%	-1.79%	-1.87%
Utilities	\$60 CO ₂	-1.77%	-2.14%	-2.51%	-2.60%	-2.74%	-2.83%	-2.86%	-2.87%	-2.86%
Utilities	\$100 CO ₂	-3.08%	-3.58%	-4.04%	-4.23%	-4.37%	-4.48%	-4.48%	-4.43%	-4.42%
Construction	\$30 CO ₂	-1.01%	-1.33%	-1.43%	-1.30%	-1.18%	-1.05%	-0.95%	-0.92%	-0.93%
Construction	\$60 CO ₂	-1.54%	-2.11%	-2.32%	-2.20%	-2.05%	-1.89%	-1.69%	-1.51%	-1.35%
Construction	\$100 CO ₂	-2.67%	-3.68%	-4.03%	-3.96%	-3.75%	-3.50%	-3.20%	-2.88%	-2.64%
Manufacturing	\$30 CO ₂	-0.51%	-0.63%	-0.73%	-0.75%	-0.77%	-0.78%	-0.80%	-0.84%	-0.87%
Manufacturing	\$60 CO ₂	-0.85%	-1.10%	-1.29%	-1.37%	-1.44%	-1.48%	-1.49%	-1.49%	-1.49%
Manufacturing	\$100 CO ₂	-1.33%	-1.72%	-2.01%	-2.17%	-2.28%	-2.36%	-2.39%	-2.41%	-2.43%

Wholesale Trade	\$30 CO ₂	-0.62%	-0.75%	-0.86%	-0.90%	-0.94%	-0.97%	-0.99%	-1.03%	-1.07%
Wholesale Trade	\$60 CO ₂	-1.04%	-1.31%	-1.53%	-1.64%	-1.73%	-1.79%	-1.81%	-1.82%	-1.82%
Wholesale Trade	\$100 CO ₂	-1.63%	-2.03%	-2.34%	-2.52%	-2.65%	-2.74%	-2.77%	-2.78%	-2.80%
Retail Trade	\$30 CO ₂	-0.93%	-0.89%	-0.93%	-0.85%	-0.85%	-0.83%	-0.83%	-0.89%	-0.94%
Retail Trade	\$60 CO ₂	-1.51%	-1.49%	-1.58%	-1.52%	-1.54%	-1.54%	-1.51%	-1.49%	-1.48%
Retail Trade	\$100 CO ₂	-2.47%	-2.50%	-2.63%	-2.64%	-2.68%	-2.70%	-2.69%	-2.67%	-2.69%
Transp, Warehousing	\$30 CO ₂	-0.38%	-0.39%	-0.41%	-0.37%	-0.35%	-0.32%	-0.30%	-0.30%	-0.30%
Transp, Warehousing	\$60 CO ₂	-0.60%	-0.65%	-0.69%	-0.66%	-0.64%	-0.60%	-0.54%	-0.49%	-0.44%
Transp, Warehousing	\$100 CO ₂	-0.99%	-1.09%	-1.16%	-1.15%	-1.12%	-1.08%	-1.01%	-0.94%	-0.88%
Information	\$30 CO ₂	-0.67%	-0.70%	-0.78%	-0.75%	-0.78%	-0.79%	-0.81%	-0.86%	-0.92%
Information	\$60 CO ₂	-1.05%	-1.16%	-1.30%	-1.32%	-1.39%	-1.44%	-1.46%	-1.47%	-1.48%
Information	\$100 CO ₂	-1.78%	-1.95%	-2.16%	-2.26%	-2.36%	-2.45%	-2.49%	-2.51%	-2.56%
Finance, Insurance	\$30 CO ₂	-0.73%	-0.76%	-0.83%	-0.80%	-0.82%	-0.82%	-0.84%	-0.91%	-0.96%
Finance, Insurance	\$60 CO ₂	-1.19%	-1.29%	-1.44%	-1.45%	-1.51%	-1.55%	-1.55%	-1.56%	-1.57%
Finance, Insurance	\$100 CO ₂	-1.92%	-2.10%	-2.33%	-2.42%	-2.52%	-2.60%	-2.63%	-2.66%	-2.71%
Real Estate and Leasing	\$30 CO ₂	-1.09%	-0.98%	-0.99%	-0.88%	-0.85%	-0.81%	-0.80%	-0.86%	-0.90%
Real Estate and Leasing	\$60 CO ₂	-1.77%	-1.65%	-1.71%	-1.59%	-1.58%	-1.55%	-1.47%	-1.42%	-1.38%

Real Estate and Leasing	\$100 CO ₂	-2.83%	-2.73%	-2.82%	-2.76%	-2.74%	-2.72%	-2.65%	-2.57%	-2.56%
Profess, Tech Services	\$30 CO ₂	-0.53%	-0.62%	-0.71%	-0.71%	-0.74%	-0.76%	-0.78%	-0.83%	-0.88%
Profess, Tech Services	\$60 CO ₂	-0.85%	-1.04%	-1.22%	-1.28%	-1.35%	-1.41%	-1.43%	-1.45%	-1.46%
Profess, Tech Services	\$100 CO ₂	-1.39%	-1.70%	-1.97%	-2.12%	-2.24%	-2.33%	-2.39%	-2.42%	-2.47%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.55%	-0.65%	-0.73%	-0.74%	-0.77%	-0.78%	-0.79%	-0.84%	-0.88%
Mngmt of Companies, Enterprises	\$60 CO ₂	-0.92%	-1.12%	-1.30%	-1.36%	-1.43%	-1.47%	-1.48%	-1.48%	-1.48%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.44%	-1.76%	-2.01%	-2.15%	-2.26%	-2.33%	-2.37%	-2.38%	-2.42%
Admin, Waste Services	\$30 CO ₂	-0.49%	-0.53%	-0.58%	-0.56%	-0.58%	-0.58%	-0.59%	-0.63%	-0.66%
Admin, Waste Services	\$60 CO ₂	-0.78%	-0.88%	-1.00%	-1.01%	-1.05%	-1.08%	-1.08%	-1.08%	-1.08%
Admin, Waste Services	\$100 CO ₂	-1.29%	-1.46%	-1.64%	-1.72%	-1.78%	-1.83%	-1.85%	-1.85%	-1.88%
Educational Services	\$30 CO ₂	-0.86%	-0.79%	-0.82%	-0.74%	-0.74%	-0.73%	-0.75%	-0.81%	-0.87%
Educational Services	\$60 CO ₂	-1.36%	-1.31%	-1.39%	-1.34%	-1.37%	-1.39%	-1.37%	-1.36%	-1.36%
Educational Services	\$100 CO ₂	-2.25%	-2.21%	-2.35%	-2.36%	-2.42%	-2.46%	-2.47%	-2.46%	-2.51%
Health Care, Social Asst	\$30 CO ₂	-0.62%	-0.57%	-0.60%	-0.56%	-0.57%	-0.58%	-0.60%	-0.65%	-0.70%
Health Care, Social Asst	\$60 CO ₂	-0.97%	-0.93%	-1.00%	-0.98%	-1.01%	-1.05%	-1.05%	-1.07%	-1.09%
Health Care, Social Asst	\$100 CO ₂	-1.65%	-1.63%	-1.74%	-1.78%	-1.85%	-1.92%	-1.96%	-1.98%	-2.05%

Arts, Entertainment, Rec	\$30 CO ₂	-0.80%	-0.75%	-0.78%	-0.70%	-0.70%	-0.69%	-0.70%	-0.75%	-0.80%
Arts, Entertainment, Rec	\$60 CO ₂	-1.27%	-1.24%	-1.32%	-1.26%	-1.29%	-1.30%	-1.27%	-1.26%	-1.25%
Arts, Entertainment, Rec	\$100 CO ₂	-2.11%	-2.10%	-2.23%	-2.24%	-2.28%	-2.31%	-2.30%	-2.28%	-2.31%
Accommodation, Food Services	\$30 CO ₂	-0.92%	-0.81%	-0.82%	-0.73%	-0.72%	-0.70%	-0.70%	-0.76%	-0.80%
Accommodation, Food Services	\$60 CO ₂	-1.48%	-1.37%	-1.41%	-1.32%	-1.33%	-1.32%	-1.27%	-1.25%	-1.23%
Accommodation, Food Services	\$100 CO ₂	-2.41%	-2.29%	-2.36%	-2.32%	-2.33%	-2.34%	-2.30%	-2.26%	-2.27%
Other Services (excl Gov)	\$30 CO ₂	-1.02%	-0.93%	-0.97%	-0.86%	-0.87%	-0.86%	-0.88%	-0.93%	-1.01%
Other Services (excl Gov)	\$60 CO ₂	-1.54%	-1.46%	-1.55%	-1.46%	-1.50%	-1.53%	-1.52%	-1.52%	-1.52%
Other Services (excl Gov)	\$100 CO ₂	-2.74%	-2.63%	-2.74%	-2.74%	-2.78%	-2.83%	-2.83%	-2.81%	-2.85%
State & Local Gov	\$30 CO ₂	0.93%	0.79%	0.64%	0.52%	0.42%	0.33%	0.25%	0.18%	0.10%
State & Local Gov	\$60 CO ₂	1.85%	1.59%	1.31%	1.07%	0.86%	0.67%	0.50%	0.35%	0.22%
State & Local Gov	\$100 CO ₂	2.47%	1.96%	1.41%	0.94%	0.55%	0.19%	-0.12%	-0.38%	-0.62%
Total Employment	\$30 CO ₂	-0.55%	-0.58%	-0.64%	-0.61%	-0.62%	-0.61%	-0.62%	-0.67%	-0.71%
Total Employment	\$60 CO ₂	-0.83%	-0.93%	-1.06%	-1.06%	-1.11%	-1.13%	-1.12%	-1.12%	-1.12%
Total Employment	\$100 CO ₂	-1.44%	-1.64%	-1.85%	-1.94%	-2.01%	-2.07%	-2.09%	-2.09%	-2.12%

Table A16: Change in Employment, Scenario 4: 95% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.15%	-0.18%	-0.20%	-0.20%	-0.21%	-0.21%	-0.21%	-0.23%	-0.24%
Forestry, Fishing, Other	\$60 CO ₂	-0.24%	-0.31%	-0.36%	-0.38%	-0.40%	-0.41%	-0.40%	-0.40%	-0.40%
Forestry, Fishing, Other	\$100 CO ₂	-0.39%	-0.49%	-0.57%	-0.61%	-0.64%	-0.67%	-0.67%	-0.68%	-0.68%
Mining	\$30 CO ₂	-0.10%	-0.12%	-0.12%	-0.09%	-0.07%	-0.03%	-0.01%	0.02%	0.03%
Mining	\$60 CO ₂	-0.15%	-0.19%	-0.20%	-0.16%	-0.11%	-0.05%	0.01%	0.08%	0.14%
Mining	\$100 CO ₂	-0.26%	-0.33%	-0.34%	-0.29%	-0.21%	-0.12%	-0.02%	0.08%	0.18%
Utilities	\$30 CO ₂	-0.98%	-1.14%	-1.35%	-1.34%	-1.42%	-1.46%	-1.49%	-1.54%	-1.63%
Utilities	\$60 CO ₂	-1.40%	-1.74%	-2.08%	-2.16%	-2.30%	-2.39%	-2.42%	-2.43%	-2.42%
Utilities	\$100 CO ₂	-2.58%	-3.03%	-3.48%	-3.67%	-3.82%	-3.94%	-3.94%	-3.91%	-3.91%
Construction	\$30 CO ₂	-0.62%	-0.84%	-0.91%	-0.77%	-0.66%	-0.56%	-0.48%	-0.47%	-0.50%
Construction	\$60 CO ₂	-0.80%	-1.19%	-1.33%	-1.21%	-1.10%	-0.99%	-0.85%	-0.72%	-0.61%
Construction	\$100 CO ₂	-1.64%	-2.43%	-2.73%	-2.70%	-2.56%	-2.40%	-2.19%	-1.96%	-1.80%
Manufacturing	\$30 CO ₂	-0.40%	-0.52%	-0.62%	-0.64%	-0.66%	-0.67%	-0.69%	-0.73%	-0.76%
Manufacturing	\$60 CO ₂	-0.65%	-0.89%	-1.09%	-1.17%	-1.24%	-1.29%	-1.30%	-1.30%	-1.29%
Manufacturing	\$100 CO ₂	-1.05%	-1.44%	-1.74%	-1.91%	-2.03%	-2.12%	-2.16%	-2.18%	-2.20%

Wholesale Trade	\$30 CO ₂	-0.48%	-0.60%	-0.72%	-0.75%	-0.80%	-0.82%	-0.84%	-0.89%	-0.92%
Wholesale Trade	\$60 CO ₂	-0.78%	-1.04%	-1.26%	-1.37%	-1.46%	-1.53%	-1.55%	-1.55%	-1.55%
Wholesale Trade	\$100 CO ₂	-1.27%	-1.66%	-1.99%	-2.18%	-2.32%	-2.41%	-2.45%	-2.47%	-2.49%
Retail Trade	\$30 CO ₂	-0.66%	-0.61%	-0.64%	-0.56%	-0.56%	-0.54%	-0.55%	-0.60%	-0.65%
Retail Trade	\$60 CO ₂	-1.00%	-0.97%	-1.05%	-0.99%	-1.01%	-1.02%	-1.00%	-0.99%	-0.98%
Retail Trade	\$100 CO ₂	-1.77%	-1.79%	-1.93%	-1.97%	-2.02%	-2.07%	-2.08%	-2.07%	-2.11%
Transp, Warehousing	\$30 CO ₂	-0.26%	-0.26%	-0.28%	-0.24%	-0.22%	-0.19%	-0.17%	-0.17%	-0.17%
Transp, Warehousing	\$60 CO ₂	-0.37%	-0.41%	-0.46%	-0.42%	-0.40%	-0.37%	-0.31%	-0.26%	-0.21%
Transp, Warehousing	\$100 CO ₂	-0.68%	-0.77%	-0.85%	-0.85%	-0.83%	-0.79%	-0.73%	-0.66%	-0.61%
Information	\$30 CO ₂	-0.50%	-0.52%	-0.60%	-0.57%	-0.59%	-0.60%	-0.62%	-0.67%	-0.73%
Information	\$60 CO ₂	-0.72%	-0.82%	-0.97%	-0.99%	-1.06%	-1.10%	-1.12%	-1.14%	-1.15%
Information	\$100 CO ₂	-1.33%	-1.50%	-1.72%	-1.83%	-1.94%	-2.04%	-2.09%	-2.11%	-2.17%
Finance, Insurance	\$30 CO ₂	-0.53%	-0.56%	-0.64%	-0.61%	-0.63%	-0.64%	-0.66%	-0.72%	-0.78%
Finance, Insurance	\$60 CO ₂	-0.80%	-0.91%	-1.08%	-1.10%	-1.17%	-1.22%	-1.23%	-1.24%	-1.25%
Finance, Insurance	\$100 CO ₂	-1.39%	-1.59%	-1.85%	-1.98%	-2.09%	-2.19%	-2.24%	-2.28%	-2.34%
Real Estate and Leasing	\$30 CO ₂	-0.81%	-0.70%	-0.71%	-0.59%	-0.57%	-0.53%	-0.53%	-0.59%	-0.63%
Real Estate and Leasing	\$60 CO ₂	-1.24%	-1.12%	-1.17%	-1.06%	-1.06%	-1.04%	-0.98%	-0.94%	-0.91%

Real Estate and Leasing	\$100 CO ₂	-2.11%	-2.01%	-2.12%	-2.09%	-2.09%	-2.10%	-2.05%	-2.01%	-2.02%
Profess, Tech Services	\$30 CO ₂	-0.35%	-0.43%	-0.52%	-0.53%	-0.56%	-0.57%	-0.60%	-0.65%	-0.69%
Profess, Tech Services	\$60 CO ₂	-0.51%	-0.69%	-0.87%	-0.93%	-1.01%	-1.07%	-1.10%	-1.12%	-1.14%
Profess, Tech Services	\$100 CO ₂	-0.93%	-1.23%	-1.51%	-1.67%	-1.81%	-1.92%	-1.99%	-2.03%	-2.09%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.44%	-0.54%	-0.62%	-0.64%	-0.66%	-0.67%	-0.69%	-0.73%	-0.77%
Mngmt of Companies, Enterprises	\$60 CO ₂	-0.71%	-0.92%	-1.10%	-1.16%	-1.24%	-1.28%	-1.29%	-1.29%	-1.29%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.15%	-1.48%	-1.75%	-1.90%	-2.02%	-2.10%	-2.14%	-2.16%	-2.19%
Admin, Waste Services	\$30 CO ₂	-0.34%	-0.37%	-0.43%	-0.41%	-0.42%	-0.42%	-0.43%	-0.47%	-0.51%
Admin, Waste Services	\$60 CO ₂	-0.49%	-0.59%	-0.71%	-0.72%	-0.77%	-0.80%	-0.80%	-0.80%	-0.81%
Admin, Waste Services	\$100 CO ₂	-0.89%	-1.06%	-1.25%	-1.34%	-1.42%	-1.49%	-1.52%	-1.53%	-1.56%
Educational Services	\$30 CO ₂	-0.55%	-0.48%	-0.52%	-0.44%	-0.45%	-0.45%	-0.46%	-0.53%	-0.59%
Educational Services	\$60 CO ₂	-0.78%	-0.73%	-0.83%	-0.79%	-0.83%	-0.87%	-0.86%	-0.86%	-0.87%
Educational Services	\$100 CO ₂	-1.45%	-1.44%	-1.61%	-1.67%	-1.75%	-1.83%	-1.86%	-1.88%	-1.95%
Health Care, Social Asst	\$30 CO ₂	-0.42%	-0.37%	-0.39%	-0.34%	-0.35%	-0.35%	-0.36%	-0.41%	-0.46%
Health Care, Social Asst	\$60 CO ₂	-0.59%	-0.54%	-0.60%	-0.57%	-0.60%	-0.63%	-0.63%	-0.64%	-0.66%
Health Care, Social Asst	\$100 CO ₂	-1.13%	-1.10%	-1.21%	-1.26%	-1.33%	-1.40%	-1.45%	-1.48%	-1.54%

Arts, Entertainment, Rec	\$30 CO ₂	-0.52%	-0.46%	-0.49%	-0.42%	-0.43%	-0.42%	-0.43%	-0.49%	-0.53%
Arts, Entertainment, Rec	\$60 CO ₂	-0.73%	-0.70%	-0.79%	-0.74%	-0.78%	-0.80%	-0.79%	-0.79%	-0.78%
Arts, Entertainment, Rec	\$100 CO ₂	-1.37%	-1.37%	-1.53%	-1.58%	-1.64%	-1.70%	-1.72%	-1.72%	-1.77%
Accommodation, Food Services	\$30 CO ₂	-0.62%	-0.52%	-0.53%	-0.44%	-0.43%	-0.41%	-0.42%	-0.48%	-0.52%
Accommodation, Food Services	\$60 CO ₂	-0.92%	-0.81%	-0.86%	-0.78%	-0.80%	-0.81%	-0.77%	-0.76%	-0.75%
Accommodation, Food Services	\$100 CO ₂	-1.64%	-1.54%	-1.64%	-1.64%	-1.68%	-1.71%	-1.70%	-1.69%	-1.72%
Other Services (excl Gov)	\$30 CO ₂	-0.77%	-0.67%	-0.70%	-0.58%	-0.59%	-0.59%	-0.60%	-0.65%	-0.73%
Other Services (excl Gov)	\$60 CO ₂	-1.06%	-0.97%	-1.05%	-0.96%	-1.00%	-1.02%	-1.02%	-1.02%	-1.03%
Other Services (excl Gov)	\$100 CO ₂	-2.09%	-1.97%	-2.09%	-2.09%	-2.15%	-2.22%	-2.23%	-2.22%	-2.28%
State & Local Gov	\$30 CO ₂	1.97%	1.86%	1.70%	1.58%	1.46%	1.36%	1.28%	1.19%	1.11%
State & Local Gov	\$60 CO ₂	3.84%	3.61%	3.30%	3.03%	2.78%	2.56%	2.34%	2.15%	1.98%
State & Local Gov	\$100 CO ₂	5.23%	4.71%	4.03%	3.45%	2.97%	2.51%	2.10%	1.75%	1.42%
Total Employment	\$30 CO ₂	-0.24%	-0.26%	-0.32%	-0.28%	-0.29%	-0.29%	-0.30%	-0.35%	-0.40%
Total Employment	\$60 CO ₂	-0.34%	-0.38%	-0.45%	-0.46%	-0.51%	-0.55%	-0.55%	-0.56%	-0.57%
Total Employment	\$100 CO ₂	-0.63%	-0.82%	-1.06%	-1.17%	-1.26%	-1.35%	-1.40%	-1.43%	-1.48%

Table A17: Change in Earnings, Scenario 1: No Distribution of Allowances

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Earnings by Place of Work	\$30 CO ₂	-0.81%	-0.90%	-0.97%	-0.95%	-0.94%	-0.93%	-0.92%	-0.94%	-0.97%
Earnings by Place of Work	\$60 CO ₂	-1.37%	-1.57%	-1.73%	-1.74%	-1.76%	-1.75%	-1.71%	-1.67%	-1.63%
Earnings by Place of Work	\$100 CO ₂	-2.15%	-2.48%	-2.70%	-2.77%	-2.79%	-2.78%	-2.73%	-2.66%	-2.62%
Wage & Salary Disbursements	\$30 CO ₂	-0.79%	-0.88%	-0.96%	-0.93%	-0.93%	-0.92%	-0.91%	-0.94%	-0.97%
Wage & Salary Disbursements	\$60 CO ₂	-1.34%	-1.54%	-1.70%	-1.71%	-1.74%	-1.74%	-1.70%	-1.66%	-1.63%
Wage & Salary Disbursements	\$100 CO ₂	-2.10%	-2.43%	-2.66%	-2.73%	-2.76%	-2.76%	-2.71%	-2.65%	-2.61%
Proprietors' income	\$30 CO ₂	-1.07%	-1.15%	-1.21%	-1.14%	-1.10%	-1.05%	-1.02%	-1.04%	-1.06%
Proprietors' income	\$60 CO ₂	-1.82%	-2.01%	-2.16%	-2.10%	-2.07%	-2.01%	-1.92%	-1.83%	-1.75%
Proprietors' income	\$100 CO ₂	-2.85%	-3.17%	-3.37%	-3.36%	-3.30%	-3.21%	-3.08%	-2.93%	-2.84%

Table A18: Change in Earnings, Scenario 2: 25- 50% of Allowances Allocated to R&D and Deployment of Renewable Technologies

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Earnings by Place of Work	\$30 CO ₂	-0.73%	-0.80%	-0.85%	-0.79%	-0.76%	-0.72%	-0.69%	-0.70%	-0.72%
Earnings by Place of Work	\$60 CO ₂	-1.00%	-1.09%	-1.15%	-1.09%	-1.05%	-0.99%	-0.92%	-0.86%	-0.81%
Earnings by Place of Work	\$100 CO ₂	-1.95%	-2.22%	-2.39%	-2.40%	-2.37%	-2.30%	-2.23%	-2.14%	-2.08%
Wage & Salary Disbursements	\$30 CO ₂	-0.72%	-0.78%	-0.84%	-0.79%	-0.76%	-0.72%	-0.69%	-0.71%	-0.72%
Wage & Salary Disbursements	\$60 CO ₂	-0.99%	-1.07%	-1.14%	-1.08%	-1.05%	-0.99%	-0.93%	-0.87%	-0.82%
Wage & Salary Disbursements	\$100 CO ₂	-1.92%	-2.18%	-2.36%	-2.37%	-2.35%	-2.29%	-2.22%	-2.14%	-2.09%
Proprietors' income	\$30 CO ₂	-0.96%	-1.00%	-1.04%	-0.93%	-0.86%	-0.78%	-0.74%	-0.74%	-0.75%
Proprietors' income	\$60 CO ₂	-1.30%	-1.34%	-1.38%	-1.25%	-1.16%	-1.06%	-0.95%	-0.86%	-0.79%
Proprietors' income	\$100 CO ₂	-2.56%	-2.80%	-2.94%	-2.86%	-2.74%	-2.59%	-2.44%	-2.29%	-2.18%

Table A19: Change in Earnings, Scenario 3: 50% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Earnings by Place of Work	\$30 CO ₂	-0.53%	-0.65%	-0.76%	-0.76%	-0.79%	-0.80%	-0.79%	-0.81%	-0.82%
Earnings by Place of Work	\$60 CO ₂	-0.79%	-0.94%	-1.09%	-1.10%	-1.13%	-1.14%	-1.12%	-1.10%	-1.08%
Earnings by Place of Work	\$100 CO ₂	-1.35%	-1.63%	-1.86%	-1.95%	-2.00%	-2.03%	-2.02%	-1.99%	-1.99%
Wage & Salary Disbursements	\$30 CO ₂	-0.49%	-0.61%	-0.73%	-0.73%	-0.76%	-0.77%	-0.77%	-0.79%	-0.80%
Wage & Salary Disbursements	\$60 CO ₂	-0.75%	-0.91%	-1.05%	-1.07%	-1.11%	-1.12%	-1.10%	-1.09%	-1.07%
Wage & Salary Disbursements	\$100 CO ₂	-1.29%	-1.57%	-1.81%	-1.90%	-1.96%	-2.00%	-2.00%	-1.97%	-1.97%
Proprietors' income	\$30 CO ₂	-1.07%	-1.16%	-1.25%	-1.19%	-1.17%	-1.14%	-1.09%	-1.08%	-1.07%
Proprietors' income	\$60 CO ₂	-1.29%	-1.42%	-1.55%	-1.50%	-1.49%	-1.45%	-1.38%	-1.32%	-1.27%
Proprietors' income	\$100 CO ₂	-2.13%	-2.38%	-2.58%	-2.59%	-2.57%	-2.53%	-2.44%	-2.34%	-2.28%

Table A20: Change in Earnings, Scenario 4: 95% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Earnings by Place of Work	\$30 CO ₂	-0.24%	-0.28%	-0.34%	-0.32%	-0.32%	-0.31%	-0.32%	-0.36%	-0.40%
Earnings by Place of Work	\$60 CO ₂	-0.27%	-0.37%	-0.51%	-0.52%	-0.56%	-0.59%	-0.59%	-0.59%	-0.59%
Earnings by Place of Work	\$100 CO ₂	-0.63%	-0.86%	-1.10%	-1.21%	-1.29%	-1.36%	-1.38%	-1.39%	-1.42%
Wage & Salary Disbursements	\$30 CO ₂	-0.21%	-0.26%	-0.32%	-0.30%	-0.30%	-0.30%	-0.31%	-0.35%	-0.39%
Wage & Salary Disbursements	\$60 CO ₂	-0.22%	-0.33%	-0.47%	-0.48%	-0.53%	-0.56%	-0.57%	-0.57%	-0.57%
Wage & Salary Disbursements	\$100 CO ₂	-0.56%	-0.79%	-1.04%	-1.15%	-1.24%	-1.32%	-1.35%	-1.36%	-1.39%
Proprietors' income	\$30 CO ₂	-0.56%	-0.58%	-0.62%	-0.55%	-0.53%	-0.50%	-0.48%	-0.52%	-0.56%
Proprietors' income	\$60 CO ₂	-0.82%	-0.89%	-1.00%	-0.95%	-0.96%	-0.95%	-0.90%	-0.86%	-0.83%
Proprietors' income	\$100 CO ₂	-1.48%	-1.67%	-1.86%	-1.89%	-1.90%	-1.90%	-1.86%	-1.80%	-1.78%

Table A21: Change in Wages and Salaries, Scenario 1: No Distribution of Allowances

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.24%	-0.28%	-0.30%	-0.28%	-0.27%	-0.25%	-0.23%	-0.23%	-0.23%
Forestry, Fishing, Other	\$60 CO ₂	-0.42%	-0.50%	-0.55%	-0.54%	-0.53%	-0.50%	-0.46%	-0.43%	-0.39%
Forestry, Fishing, Other	\$100 CO ₂	-0.64%	-0.76%	-0.83%	-0.83%	-0.80%	-0.76%	-0.71%	-0.65%	-0.61%
Mining	\$30 CO ₂	-0.18%	-0.22%	-0.23%	-0.18%	-0.13%	-0.08%	-0.03%	0.01%	0.05%
Mining	\$60 CO ₂	-0.31%	-0.40%	-0.41%	-0.35%	-0.27%	-0.17%	-0.06%	0.05%	0.15%
Mining	\$100 CO ₂	-0.49%	-0.62%	-0.64%	-0.54%	-0.41%	-0.25%	-0.08%	0.10%	0.26%
Utilities	\$30 CO ₂	-1.39%	-1.59%	-1.80%	-1.79%	-1.85%	-1.88%	-1.90%	-1.93%	-2.00%
Utilities	\$60 CO ₂	-2.26%	-2.71%	-3.11%	-3.20%	-3.32%	-3.38%	-3.37%	-3.34%	-3.30%
Utilities	\$100 CO ₂	-3.76%	-4.36%	-4.84%	-5.01%	-5.10%	-5.15%	-5.07%	-4.95%	-4.88%
Construction	\$30 CO ₂	-1.46%	-1.89%	-2.03%	-1.89%	-1.74%	-1.57%	-1.42%	-1.35%	-1.33%
Construction	\$60 CO ₂	-2.45%	-3.25%	-3.54%	-3.40%	-3.19%	-2.94%	-2.65%	-2.37%	-2.12%
Construction	\$100 CO ₂	-3.92%	-5.24%	-5.65%	-5.52%	-5.19%	-4.79%	-4.33%	-3.85%	-3.45%
Manufacturing	\$30 CO ₂	-0.56%	-0.70%	-0.79%	-0.80%	-0.81%	-0.81%	-0.80%	-0.82%	-0.84%
Manufacturing	\$60 CO ₂	-0.97%	-1.25%	-1.44%	-1.51%	-1.55%	-1.56%	-1.54%	-1.51%	-1.48%
Manufacturing	\$100 CO ₂	-1.47%	-1.90%	-2.16%	-2.29%	-2.35%	-2.37%	-2.35%	-2.31%	-2.28%

Wholesale Trade	\$30 CO ₂	-0.81%	-0.96%	-1.08%	-1.10%	-1.13%	-1.13%	-1.14%	-1.16%	-1.19%
Wholesale Trade	\$60 CO ₂	-1.42%	-1.72%	-1.96%	-2.05%	-2.12%	-2.15%	-2.13%	-2.10%	-2.06%
Wholesale Trade	\$100 CO ₂	-2.16%	-2.61%	-2.91%	-3.06%	-3.14%	-3.16%	-3.13%	-3.07%	-3.03%
Retail Trade	\$30 CO ₂	-1.26%	-1.24%	-1.29%	-1.20%	-1.18%	-1.14%	-1.12%	-1.16%	-1.19%
Retail Trade	\$60 CO ₂	-2.15%	-2.19%	-2.30%	-2.22%	-2.21%	-2.18%	-2.10%	-2.04%	-1.98%
Retail Trade	\$100 CO ₂	-3.36%	-3.45%	-3.58%	-3.55%	-3.52%	-3.47%	-3.38%	-3.27%	-3.22%
Transp, Warehousing	\$30 CO ₂	-0.52%	-0.56%	-0.58%	-0.53%	-0.49%	-0.44%	-0.39%	-0.37%	-0.36%
Transp, Warehousing	\$60 CO ₂	-0.89%	-0.98%	-1.04%	-0.98%	-0.93%	-0.86%	-0.76%	-0.67%	-0.58%
Transp, Warehousing	\$100 CO ₂	-1.39%	-1.54%	-1.61%	-1.57%	-1.48%	-1.37%	-1.23%	-1.08%	-0.95%
Information	\$30 CO ₂	-0.88%	-0.93%	-1.01%	-0.98%	-0.99%	-0.98%	-0.98%	-1.01%	-1.06%
Information	\$60 CO ₂	-1.46%	-1.61%	-1.78%	-1.78%	-1.83%	-1.84%	-1.82%	-1.80%	-1.78%
Information	\$100 CO ₂	-2.36%	-2.59%	-2.80%	-2.87%	-2.91%	-2.94%	-2.91%	-2.86%	-2.85%
Finance, Insurance	\$30 CO ₂	-0.97%	-1.01%	-1.07%	-1.02%	-1.02%	-1.00%	-0.99%	-1.04%	-1.08%
Finance, Insurance	\$60 CO ₂	-1.66%	-1.78%	-1.93%	-1.91%	-1.93%	-1.93%	-1.88%	-1.85%	-1.82%
Finance, Insurance	\$100 CO ₂	-2.58%	-2.78%	-2.97%	-3.01%	-3.03%	-3.03%	-2.98%	-2.93%	-2.92%
Real Estate and Leasing	\$30 CO ₂	-1.24%	-1.18%	-1.20%	-1.10%	-1.06%	-1.01%	-0.98%	-1.02%	-1.04%
Real Estate and Leasing	\$60 CO ₂	-2.12%	-2.09%	-2.17%	-2.06%	-2.03%	-1.97%	-1.86%	-1.78%	-1.70%

Real Estate and Leasing	\$100 CO ₂	-3.26%	-3.27%	-3.36%	-3.29%	-3.22%	-3.13%	-3.00%	-2.86%	-2.78%
Profess, Tech Services	\$30 CO ₂	-0.76%	-0.87%	-0.97%	-0.96%	-0.97%	-0.96%	-0.96%	-0.99%	-1.03%
Profess, Tech Services	\$60 CO ₂	-1.31%	-1.54%	-1.73%	-1.78%	-1.82%	-1.84%	-1.82%	-1.79%	-1.77%
Profess, Tech Services	\$100 CO ₂	-2.02%	-2.40%	-2.66%	-2.77%	-2.83%	-2.85%	-2.83%	-2.79%	-2.78%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.71%	-0.82%	-0.91%	-0.90%	-0.91%	-0.90%	-0.89%	-0.92%	-0.95%
Mngmt of Companies, Enterprises	\$60 CO ₂	-1.24%	-1.47%	-1.65%	-1.69%	-1.73%	-1.74%	-1.71%	-1.68%	-1.65%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.89%	-2.25%	-2.49%	-2.59%	-2.64%	-2.65%	-2.62%	-2.58%	-2.55%
Admin, Waste Services	\$30 CO ₂	-0.70%	-0.76%	-0.82%	-0.79%	-0.78%	-0.76%	-0.75%	-0.77%	-0.79%
Admin, Waste Services	\$60 CO ₂	-1.19%	-1.34%	-1.47%	-1.46%	-1.47%	-1.46%	-1.41%	-1.37%	-1.33%
Admin, Waste Services	\$100 CO ₂	-1.86%	-2.10%	-2.27%	-2.31%	-2.31%	-2.29%	-2.23%	-2.16%	-2.12%
Educational Services	\$30 CO ₂	-1.23%	-1.17%	-1.20%	-1.11%	-1.08%	-1.05%	-1.04%	-1.08%	-1.12%
Educational Services	\$60 CO ₂	-2.09%	-2.06%	-2.15%	-2.06%	-2.05%	-2.02%	-1.95%	-1.90%	-1.85%
Educational Services	\$100 CO ₂	-3.25%	-3.24%	-3.34%	-3.30%	-3.27%	-3.23%	-3.15%	-3.06%	-3.02%
Health Care, Social Asst	\$30 CO ₂	-0.78%	-0.77%	-0.82%	-0.78%	-0.78%	-0.78%	-0.78%	-0.82%	-0.86%
Health Care, Social Asst	\$60 CO ₂	-1.30%	-1.34%	-1.43%	-1.42%	-1.44%	-1.46%	-1.44%	-1.43%	-1.42%
Health Care, Social Asst	\$100 CO ₂	-2.09%	-2.16%	-2.29%	-2.32%	-2.36%	-2.38%	-2.37%	-2.34%	-2.35%

Arts, Entertainment, Rec	\$30 CO ₂	-1.15%	-1.11%	-1.15%	-1.06%	-1.03%	-1.00%	-0.98%	-1.02%	-1.04%
Arts, Entertainment, Rec	\$60 CO ₂	-1.96%	-1.96%	-2.04%	-1.96%	-1.95%	-1.91%	-1.84%	-1.77%	-1.72%
Arts, Entertainment, Rec	\$100 CO ₂	-3.07%	-3.09%	-3.19%	-3.15%	-3.11%	-3.05%	-2.96%	-2.85%	-2.80%
Accommodation, Food Services	\$30 CO ₂	-1.22%	-1.15%	-1.16%	-1.05%	-1.02%	-0.98%	-0.96%	-0.99%	-1.02%
Accommodation, Food Services	\$60 CO ₂	-2.09%	-2.03%	-2.08%	-1.97%	-1.95%	-1.90%	-1.80%	-1.73%	-1.67%
Accommodation, Food Services	\$100 CO ₂	-3.23%	-3.18%	-3.23%	-3.15%	-3.09%	-3.01%	-2.89%	-2.77%	-2.70%
Other Services (excl Gov)	\$30 CO ₂	-1.20%	-1.16%	-1.21%	-1.12%	-1.11%	-1.08%	-1.07%	-1.12%	-1.16%
Other Services (excl Gov)	\$60 CO ₂	-2.01%	-2.02%	-2.12%	-2.05%	-2.06%	-2.04%	-1.98%	-1.94%	-1.90%
Other Services (excl Gov)	\$100 CO ₂	-3.23%	-3.26%	-3.38%	-3.36%	-3.35%	-3.32%	-3.25%	-3.16%	-3.13%

Table A22: Change in Wages and Salaries, Scenario 2: 25- 50% of Allowances Allocated to R&D and Deployment of Renewable Technologies

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.23%	-0.27%	-0.28%	-0.26%	-0.24%	-0.22%	-0.20%	-0.20%	-0.20%
Forestry, Fishing, Other	\$60 CO ₂	-0.35%	-0.41%	-0.44%	-0.42%	-0.41%	-0.38%	-0.34%	-0.31%	-0.28%
Forestry, Fishing, Other	\$100 CO ₂	-0.62%	-0.73%	-0.79%	-0.78%	-0.74%	-0.70%	-0.64%	-0.58%	-0.54%
Mining	\$30 CO ₂	-0.17%	-0.19%	-0.18%	-0.11%	-0.04%	0.04%	0.11%	0.17%	0.23%
Mining	\$60 CO ₂	-0.22%	-0.23%	-0.18%	-0.06%	0.07%	0.21%	0.35%	0.48%	0.60%
Mining	\$100 CO ₂	-0.46%	-0.54%	-0.51%	-0.36%	-0.18%	0.03%	0.25%	0.47%	0.67%
Utilities	\$30 CO ₂	-1.36%	-1.21%	-1.04%	-0.63%	-0.27%	0.15%	0.58%	0.96%	1.27%
Utilities	\$60 CO ₂	-1.31%	-0.71%	-0.11%	0.73%	1.50%	2.31%	3.15%	3.89%	4.56%
Utilities	\$100 CO ₂	-3.67%	-3.37%	-2.87%	-2.07%	-1.18%	-0.24%	0.80%	1.74%	2.53%
Construction	\$30 CO ₂	-1.27%	-1.64%	-1.71%	-1.49%	-1.27%	-1.03%	-0.86%	-0.76%	-0.71%
Construction	\$60 CO ₂	-1.58%	-2.01%	-2.06%	-1.75%	-1.43%	-1.09%	-0.81%	-0.54%	-0.32%
Construction	\$100 CO ₂	-3.42%	-4.58%	-4.85%	-4.58%	-4.11%	-3.57%	-3.07%	-2.57%	-2.16%
Manufacturing	\$30 CO ₂	-0.48%	-0.60%	-0.68%	-0.67%	-0.67%	-0.64%	-0.63%	-0.64%	-0.66%
Manufacturing	\$60 CO ₂	-0.70%	-0.90%	-1.03%	-1.04%	-1.05%	-1.02%	-0.98%	-0.94%	-0.90%
Manufacturing	\$100 CO ₂	-1.26%	-1.65%	-1.89%	-1.98%	-2.01%	-2.00%	-1.97%	-1.92%	-1.89%

Wholesale Trade	\$30 CO ₂	-0.78%	-0.91%	-1.01%	-1.02%	-1.03%	-1.02%	-1.01%	-1.02%	-1.03%
Wholesale Trade	\$60 CO ₂	-1.18%	-1.41%	-1.58%	-1.62%	-1.64%	-1.63%	-1.58%	-1.52%	-1.46%
Wholesale Trade	\$100 CO ₂	-2.07%	-2.48%	-2.76%	-2.87%	-2.91%	-2.90%	-2.84%	-2.75%	-2.68%
Retail Trade	\$30 CO ₂	-1.21%	-1.17%	-1.20%	-1.09%	-1.05%	-0.98%	-0.95%	-0.98%	-1.00%
Retail Trade	\$60 CO ₂	-1.76%	-1.70%	-1.73%	-1.60%	-1.54%	-1.47%	-1.37%	-1.29%	-1.23%
Retail Trade	\$100 CO ₂	-3.23%	-3.28%	-3.36%	-3.28%	-3.21%	-3.12%	-3.00%	-2.87%	-2.80%
Transp, Warehousing	\$30 CO ₂	-0.69%	-0.72%	-0.73%	-0.63%	-0.55%	-0.45%	-0.33%	-0.23%	-0.12%
Transp, Warehousing	\$60 CO ₂	-0.69%	-0.72%	-0.73%	-0.63%	-0.55%	-0.45%	-0.33%	-0.23%	-0.12%
Transp, Warehousing	\$100 CO ₂	-1.31%	-1.43%	-1.47%	-1.39%	-1.28%	-1.14%	-0.97%	-0.81%	-0.66%
Information	\$30 CO ₂	-0.84%	-0.88%	-0.94%	-0.88%	-0.87%	-0.85%	-0.83%	-0.85%	-0.87%
Information	\$60 CO ₂	-1.12%	-1.19%	-1.28%	-1.23%	-1.23%	-1.20%	-1.15%	-1.10%	-1.05%
Information	\$100 CO ₂	-2.26%	-2.45%	-2.62%	-2.65%	-2.65%	-2.63%	-2.57%	-2.49%	-2.45%
Finance, Insurance	\$30 CO ₂	-0.92%	-0.93%	-0.98%	-0.92%	-0.89%	-0.86%	-0.84%	-0.88%	-0.91%
Finance, Insurance	\$60 CO ₂	-1.28%	-1.31%	-1.38%	-1.31%	-1.29%	-1.25%	-1.20%	-1.16%	-1.12%
Finance, Insurance	\$100 CO ₂	-2.43%	-2.59%	-2.75%	-2.75%	-2.74%	-2.70%	-2.65%	-2.59%	-2.57%
Real Estate and Leasing	\$30 CO ₂	-1.19%	-1.12%	-1.13%	-1.00%	-0.95%	-0.88%	-0.83%	-0.86%	-0.87%
Real Estate and Leasing	\$60 CO ₂	-1.67%	-1.57%	-1.58%	-1.44%	-1.37%	-1.29%	-1.18%	-1.09%	-1.02%

Real Estate and Leasing	\$100 CO ₂	-3.15%	-3.11%	-3.17%	-3.05%	-2.95%	-2.82%	-2.67%	-2.51%	-2.41%
Profess, Tech Services	\$30 CO ₂	-0.45%	-0.51%	-0.55%	-0.50%	-0.46%	-0.40%	-0.40%	-0.43%	-0.46%
Profess, Tech Services	\$60 CO ₂	-0.51%	-0.57%	-0.63%	-0.56%	-0.50%	-0.43%	-0.42%	-0.40%	-0.38%
Profess, Tech Services	\$100 CO ₂	-1.20%	-1.46%	-1.64%	-1.67%	-1.65%	-1.61%	-1.62%	-1.61%	-1.61%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.67%	-0.77%	-0.84%	-0.83%	-0.82%	-0.79%	-0.78%	-0.80%	-0.81%
Mngmt of Companies, Enterprises	\$60 CO ₂	-1.00%	-1.16%	-1.28%	-1.27%	-1.27%	-1.25%	-1.20%	-1.15%	-1.11%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.78%	-2.11%	-2.33%	-2.40%	-2.43%	-2.41%	-2.36%	-2.30%	-2.26%
Admin, Waste Services	\$30 CO ₂	-0.62%	-0.66%	-0.71%	-0.66%	-0.63%	-0.59%	-0.57%	-0.59%	-0.60%
Admin, Waste Services	\$60 CO ₂	-0.86%	-0.92%	-0.98%	-0.93%	-0.90%	-0.86%	-0.81%	-0.76%	-0.72%
Admin, Waste Services	\$100 CO ₂	-1.66%	-1.85%	-1.99%	-1.99%	-1.97%	-1.92%	-1.85%	-1.78%	-1.74%
Educational Services	\$30 CO ₂	-1.18%	-1.10%	-1.12%	-1.00%	-0.96%	-0.91%	-0.88%	-0.92%	-0.95%
Educational Services	\$60 CO ₂	-1.67%	-1.57%	-1.59%	-1.46%	-1.41%	-1.35%	-1.27%	-1.20%	-1.15%
Educational Services	\$100 CO ₂	-3.13%	-3.08%	-3.14%	-3.05%	-2.99%	-2.91%	-2.81%	-2.70%	-2.65%
Health Care, Social Asst	\$30 CO ₂	-0.75%	-0.73%	-0.76%	-0.71%	-0.70%	-0.68%	-0.68%	-0.71%	-0.74%
Health Care, Social Asst	\$60 CO ₂	-1.03%	-1.01%	-1.05%	-1.00%	-0.99%	-0.97%	-0.94%	-0.91%	-0.89%
Health Care, Social Asst	\$100 CO ₂	-2.02%	-2.06%	-2.16%	-2.16%	-2.17%	-2.16%	-2.13%	-2.09%	-2.08%

Arts, Entertainment, Rec	\$30 CO ₂	-1.10%	-1.04%	-1.05%	-0.94%	-0.90%	-0.84%	-0.81%	-0.84%	-0.86%
Arts, Entertainment, Rec	\$60 CO ₂	-1.55%	-1.46%	-1.49%	-1.36%	-1.30%	-1.24%	-1.15%	-1.08%	-1.02%
Arts, Entertainment, Rec	\$100 CO ₂	-2.92%	-2.90%	-2.96%	-2.87%	-2.79%	-2.70%	-2.59%	-2.46%	-2.40%
Accommodation, Food Services	\$30 CO ₂	-1.18%	-1.08%	-1.08%	-0.95%	-0.90%	-0.84%	-0.81%	-0.84%	-0.85%
Accommodation, Food Services	\$60 CO ₂	-1.70%	-1.56%	-1.56%	-1.40%	-1.34%	-1.26%	-1.16%	-1.08%	-1.01%
Accommodation, Food Services	\$100 CO ₂	-3.11%	-3.01%	-3.03%	-2.91%	-2.81%	-2.70%	-2.56%	-2.42%	-2.34%
Other Services (excl Gov)	\$30 CO ₂	-1.16%	-1.10%	-1.13%	-1.02%	-0.99%	-0.94%	-0.92%	-0.95%	-0.99%
Other Services (excl Gov)	\$60 CO ₂	-1.57%	-1.50%	-1.55%	-1.43%	-1.39%	-1.34%	-1.27%	-1.22%	-1.17%
Other Services (excl Gov)	\$100 CO ₂	-3.10%	-3.09%	-3.18%	-3.11%	-3.06%	-3.00%	-2.91%	-2.80%	-2.76%

Table A23: Change in Wages and Salaries, Scenario 3: 50% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.19%	-0.22%	-0.24%	-0.23%	-0.22%	-0.21%	-0.20%	-0.20%	-0.20%
Forestry, Fishing, Other	\$60 CO ₂	-0.32%	-0.39%	-0.44%	-0.44%	-0.43%	-0.42%	-0.39%	-0.37%	-0.34%
Forestry, Fishing, Other	\$100 CO ₂	-0.50%	-0.61%	-0.68%	-0.69%	-0.69%	-0.67%	-0.63%	-0.59%	-0.56%
Mining	\$30 CO ₂	-0.14%	-0.17%	-0.17%	-0.13%	-0.08%	-0.03%	0.01%	0.05%	0.08%
Mining	\$60 CO ₂	-0.23%	-0.28%	-0.29%	-0.23%	-0.15%	-0.07%	0.03%	0.12%	0.21%
Mining	\$100 CO ₂	-0.37%	-0.46%	-0.47%	-0.39%	-0.27%	-0.13%	0.03%	0.18%	0.33%
Utilities	\$30 CO ₂	-1.20%	-1.39%	-1.61%	-1.60%	-1.67%	-1.70%	-1.72%	-1.76%	-1.83%
Utilities	\$60 CO ₂	-1.81%	-2.20%	-2.57%	-2.65%	-2.78%	-2.84%	-2.85%	-2.83%	-2.80%
Utilities	\$100 CO ₂	-3.15%	-3.67%	-4.14%	-4.31%	-4.42%	-4.49%	-4.44%	-4.35%	-4.31%
Construction	\$30 CO ₂	-1.03%	-1.36%	-1.46%	-1.32%	-1.19%	-1.04%	-0.93%	-0.89%	-0.89%
Construction	\$60 CO ₂	-1.58%	-2.17%	-2.38%	-2.25%	-2.08%	-1.90%	-1.68%	-1.47%	-1.28%
Construction	\$100 CO ₂	-2.73%	-3.77%	-4.13%	-4.04%	-3.80%	-3.51%	-3.17%	-2.80%	-2.52%
Manufacturing	\$30 CO ₂	-0.45%	-0.58%	-0.68%	-0.69%	-0.70%	-0.70%	-0.70%	-0.73%	-0.75%
Manufacturing	\$60 CO ₂	-0.76%	-1.02%	-1.20%	-1.27%	-1.32%	-1.35%	-1.34%	-1.32%	-1.29%
Manufacturing	\$100 CO ₂	-1.19%	-1.58%	-1.85%	-1.99%	-2.07%	-2.11%	-2.11%	-2.08%	-2.07%

Wholesale Trade	\$30 CO ₂	-0.65%	-0.78%	-0.90%	-0.92%	-0.96%	-0.96%	-0.97%	-1.01%	-1.03%
Wholesale Trade	\$60 CO ₂	-1.08%	-1.37%	-1.59%	-1.68%	-1.76%	-1.80%	-1.80%	-1.78%	-1.76%
Wholesale Trade	\$100 CO ₂	-1.70%	-2.12%	-2.43%	-2.60%	-2.70%	-2.75%	-2.74%	-2.70%	-2.68%
Retail Trade	\$30 CO ₂	-0.96%	-0.92%	-0.96%	-0.88%	-0.86%	-0.82%	-0.81%	-0.86%	-0.90%
Retail Trade	\$60 CO ₂	-1.55%	-1.55%	-1.64%	-1.57%	-1.57%	-1.55%	-1.50%	-1.45%	-1.42%
Retail Trade	\$100 CO ₂	-2.54%	-2.59%	-2.73%	-2.72%	-2.72%	-2.71%	-2.66%	-2.59%	-2.57%
Transp, Warehousing	\$30 CO ₂	-0.38%	-0.41%	-0.43%	-0.38%	-0.34%	-0.30%	-0.26%	-0.24%	-0.23%
Transp, Warehousing	\$60 CO ₂	-0.61%	-0.68%	-0.73%	-0.68%	-0.63%	-0.57%	-0.49%	-0.41%	-0.33%
Transp, Warehousing	\$100 CO ₂	-1.01%	-1.13%	-1.20%	-1.17%	-1.11%	-1.02%	-0.91%	-0.78%	-0.67%
Information	\$30 CO ₂	-0.69%	-0.73%	-0.80%	-0.77%	-0.78%	-0.78%	-0.78%	-0.82%	-0.87%
Information	\$60 CO ₂	-1.07%	-1.19%	-1.34%	-1.35%	-1.40%	-1.43%	-1.42%	-1.41%	-1.40%
Information	\$100 CO ₂	-1.83%	-2.02%	-2.23%	-2.32%	-2.38%	-2.43%	-2.43%	-2.41%	-2.41%
Finance, Insurance	\$30 CO ₂	-0.75%	-0.78%	-0.85%	-0.80%	-0.81%	-0.79%	-0.80%	-0.85%	-0.89%
Finance, Insurance	\$60 CO ₂	-1.20%	-1.31%	-1.46%	-1.46%	-1.50%	-1.51%	-1.49%	-1.47%	-1.46%
Finance, Insurance	\$100 CO ₂	-1.95%	-2.15%	-2.36%	-2.43%	-2.49%	-2.52%	-2.52%	-2.49%	-2.51%
Real Estate and Leasing	\$30 CO ₂	-0.97%	-0.90%	-0.92%	-0.82%	-0.79%	-0.75%	-0.73%	-0.77%	-0.80%
Real Estate and Leasing	\$60 CO ₂	-1.58%	-1.52%	-1.59%	-1.49%	-1.48%	-1.44%	-1.35%	-1.29%	-1.24%

Real Estate and Leasing	\$100 CO ₂	-2.53%	-2.51%	-2.61%	-2.56%	-2.53%	-2.49%	-2.40%	-2.30%	-2.25%
Profess, Tech Services	\$30 CO ₂	-0.56%	-0.65%	-0.74%	-0.74%	-0.75%	-0.75%	-0.76%	-0.80%	-0.84%
Profess, Tech Services	\$60 CO ₂	-0.89%	-1.10%	-1.28%	-1.33%	-1.39%	-1.42%	-1.41%	-1.41%	-1.40%
Profess, Tech Services	\$100 CO ₂	-1.46%	-1.79%	-2.07%	-2.19%	-2.28%	-2.34%	-2.35%	-2.34%	-2.35%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.58%	-0.68%	-0.77%	-0.77%	-0.78%	-0.77%	-0.78%	-0.81%	-0.84%
Mngmt of Companies, Enterprises	\$60 CO ₂	-0.96%	-1.18%	-1.36%	-1.41%	-1.46%	-1.48%	-1.47%	-1.45%	-1.42%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.51%	-1.85%	-2.11%	-2.23%	-2.30%	-2.34%	-2.34%	-2.31%	-2.30%
Admin, Waste Services	\$30 CO ₂	-0.52%	-0.57%	-0.62%	-0.59%	-0.59%	-0.58%	-0.57%	-0.60%	-0.63%
Admin, Waste Services	\$60 CO ₂	-0.83%	-0.95%	-1.07%	-1.07%	-1.09%	-1.10%	-1.07%	-1.04%	-1.02%
Admin, Waste Services	\$100 CO ₂	-1.36%	-1.57%	-1.75%	-1.81%	-1.84%	-1.85%	-1.82%	-1.78%	-1.76%
Educational Services	\$30 CO ₂	-0.88%	-0.82%	-0.85%	-0.77%	-0.75%	-0.73%	-0.73%	-0.78%	-0.83%
Educational Services	\$60 CO ₂	-1.40%	-1.36%	-1.45%	-1.39%	-1.40%	-1.40%	-1.35%	-1.32%	-1.30%
Educational Services	\$100 CO ₂	-2.32%	-2.31%	-2.44%	-2.44%	-2.46%	-2.47%	-2.43%	-2.39%	-2.39%
Health Care, Social Asst	\$30 CO ₂	-0.58%	-0.56%	-0.59%	-0.54%	-0.55%	-0.54%	-0.55%	-0.59%	-0.62%
Health Care, Social Asst	\$60 CO ₂	-0.91%	-0.90%	-0.98%	-0.95%	-0.98%	-0.99%	-0.98%	-0.97%	-0.97%
Health Care, Social Asst	\$100 CO ₂	-1.56%	-1.58%	-1.69%	-1.73%	-1.77%	-1.81%	-1.81%	-1.80%	-1.83%

Arts, Entertainment, Rec	\$30 CO ₂	-0.83%	-0.78%	-0.82%	-0.73%	-0.72%	-0.69%	-0.68%	-0.73%	-0.76%
Arts, Entertainment, Rec	\$60 CO ₂	-1.32%	-1.30%	-1.39%	-1.32%	-1.33%	-1.31%	-1.26%	-1.22%	-1.19%
Arts, Entertainment, Rec	\$100 CO ₂	-2.19%	-2.20%	-2.33%	-2.33%	-2.33%	-2.32%	-2.27%	-2.21%	-2.19%
Accommodation, Food Services	\$30 CO ₂	-0.91%	-0.83%	-0.84%	-0.74%	-0.72%	-0.68%	-0.67%	-0.72%	-0.75%
Accommodation, Food Services	\$60 CO ₂	-1.47%	-1.39%	-1.45%	-1.35%	-1.35%	-1.32%	-1.25%	-1.20%	-1.16%
Accommodation, Food Services	\$100 CO ₂	-2.38%	-2.32%	-2.40%	-2.36%	-2.34%	-2.31%	-2.24%	-2.15%	-2.12%
Other Services (excl Gov)	\$30 CO ₂	-0.91%	-0.85%	-0.89%	-0.80%	-0.79%	-0.77%	-0.77%	-0.82%	-0.87%
Other Services (excl Gov)	\$60 CO ₂	-1.41%	-1.39%	-1.48%	-1.41%	-1.43%	-1.43%	-1.39%	-1.36%	-1.34%
Other Services (excl Gov)	\$100 CO ₂	-2.41%	-2.41%	-2.54%	-2.54%	-2.56%	-2.58%	-2.54%	-2.49%	-2.49%

Table A24: Change in Wages and Salaries, Scenario 4: 95% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forestry, Fishing, Other	\$30 CO ₂	-0.15%	-0.17%	-0.19%	-0.18%	-0.17%	-0.17%	-0.16%	-0.17%	-0.18%
Forestry, Fishing, Other	\$60 CO ₂	-0.23%	-0.29%	-0.34%	-0.34%	-0.35%	-0.35%	-0.33%	-0.32%	-0.30%
Forestry, Fishing, Other	\$100 CO ₂	-0.38%	-0.47%	-0.55%	-0.57%	-0.58%	-0.58%	-0.56%	-0.53%	-0.52%
Mining	\$30 CO ₂	-0.10%	-0.11%	-0.11%	-0.07%	-0.03%	0.02%	0.06%	0.09%	0.11%
Mining	\$60 CO ₂	-0.15%	-0.18%	-0.18%	-0.12%	-0.05%	0.02%	0.11%	0.19%	0.27%
Mining	\$100 CO ₂	-0.26%	-0.32%	-0.32%	-0.24%	-0.14%	-0.01%	0.12%	0.26%	0.40%
Utilities	\$30 CO ₂	-0.99%	-1.15%	-1.35%	-1.33%	-1.40%	-1.43%	-1.46%	-1.50%	-1.58%
Utilities	\$60 CO ₂	-1.40%	-1.74%	-2.08%	-2.15%	-2.28%	-2.36%	-2.37%	-2.37%	-2.35%
Utilities	\$100 CO ₂	-2.59%	-3.05%	-3.50%	-3.68%	-3.80%	-3.89%	-3.87%	-3.81%	-3.79%
Construction	\$30 CO ₂	-0.62%	-0.85%	-0.91%	-0.76%	-0.65%	-0.53%	-0.44%	-0.43%	-0.46%
Construction	\$60 CO ₂	-0.80%	-1.19%	-1.33%	-1.20%	-1.08%	-0.95%	-0.80%	-0.66%	-0.53%
Construction	\$100 CO ₂	-1.66%	-2.45%	-2.75%	-2.70%	-2.54%	-2.36%	-2.12%	-1.86%	-1.67%
Manufacturing	\$30 CO ₂	-0.36%	-0.47%	-0.56%	-0.58%	-0.59%	-0.60%	-0.60%	-0.63%	-0.66%
Manufacturing	\$60 CO ₂	-0.58%	-0.81%	-0.99%	-1.06%	-1.12%	-1.15%	-1.15%	-1.14%	-1.12%
Manufacturing	\$100 CO ₂	-0.93%	-1.30%	-1.57%	-1.72%	-1.82%	-1.88%	-1.89%	-1.88%	-1.88%

Wholesale Trade	\$30 CO ₂	-0.49%	-0.61%	-0.72%	-0.75%	-0.78%	-0.79%	-0.81%	-0.84%	-0.87%
Wholesale Trade	\$60 CO ₂	-0.78%	-1.04%	-1.26%	-1.36%	-1.44%	-1.49%	-1.50%	-1.49%	-1.48%
Wholesale Trade	\$100 CO ₂	-1.29%	-1.68%	-2.00%	-2.18%	-2.30%	-2.37%	-2.38%	-2.37%	-2.36%
Retail Trade	\$30 CO ₂	-0.67%	-0.62%	-0.64%	-0.56%	-0.54%	-0.51%	-0.51%	-0.56%	-0.60%
Retail Trade	\$60 CO ₂	-1.01%	-0.97%	-1.05%	-0.98%	-0.99%	-0.99%	-0.95%	-0.93%	-0.91%
Retail Trade	\$100 CO ₂	-1.79%	-1.81%	-1.95%	-1.97%	-2.00%	-2.02%	-2.01%	-1.97%	-1.99%
Transp, Warehousing	\$30 CO ₂	-0.26%	-0.26%	-0.28%	-0.23%	-0.20%	-0.15%	-0.12%	-0.11%	-0.10%
Transp, Warehousing	\$60 CO ₂	-0.37%	-0.41%	-0.44%	-0.40%	-0.36%	-0.32%	-0.24%	-0.18%	-0.11%
Transp, Warehousing	\$100 CO ₂	-0.68%	-0.76%	-0.83%	-0.81%	-0.77%	-0.70%	-0.61%	-0.50%	-0.42%
Information	\$30 CO ₂	-0.50%	-0.53%	-0.59%	-0.56%	-0.57%	-0.57%	-0.58%	-0.62%	-0.67%
Information	\$60 CO ₂	-0.71%	-0.81%	-0.95%	-0.96%	-1.02%	-1.05%	-1.06%	-1.06%	-1.06%
Information	\$100 CO ₂	-1.34%	-1.50%	-1.72%	-1.82%	-1.90%	-1.97%	-1.99%	-1.99%	-2.02%
Finance, Insurance	\$30 CO ₂	-0.53%	-0.55%	-0.62%	-0.58%	-0.59%	-0.59%	-0.60%	-0.65%	-0.70%
Finance, Insurance	\$60 CO ₂	-0.79%	-0.89%	-1.04%	-1.05%	-1.11%	-1.14%	-1.13%	-1.13%	-1.12%
Finance, Insurance	\$100 CO ₂	-1.38%	-1.57%	-1.81%	-1.91%	-2.00%	-2.07%	-2.09%	-2.09%	-2.13%
Real Estate and Leasing	\$30 CO ₂	-0.72%	-0.63%	-0.64%	-0.54%	-0.52%	-0.48%	-0.47%	-0.52%	-0.56%
Real Estate and Leasing	\$60 CO ₂	-1.09%	-1.01%	-1.07%	-0.98%	-0.98%	-0.96%	-0.89%	-0.85%	-0.82%

Real Estate and Leasing	\$100 CO ₂	-1.85%	-1.81%	-1.93%	-1.91%	-1.91%	-1.90%	-1.85%	-1.78%	-1.77%
Profess, Tech Services	\$30 CO ₂	-0.36%	-0.44%	-0.52%	-0.52%	-0.54%	-0.55%	-0.56%	-0.60%	-0.65%
Profess, Tech Services	\$60 CO ₂	-0.52%	-0.69%	-0.87%	-0.92%	-0.99%	-1.04%	-1.05%	-1.06%	-1.06%
Profess, Tech Services	\$100 CO ₂	-0.94%	-1.25%	-1.52%	-1.67%	-1.79%	-1.87%	-1.92%	-1.93%	-1.97%
Mngmt of Companies, Enterprises	\$30 CO ₂	-0.45%	-0.54%	-0.63%	-0.63%	-0.64%	-0.65%	-0.65%	-0.69%	-0.72%
Mngmt of Companies, Enterprises	\$60 CO ₂	-0.71%	-0.92%	-1.09%	-1.15%	-1.21%	-1.25%	-1.24%	-1.23%	-1.22%
Mngmt of Companies, Enterprises	\$100 CO ₂	-1.17%	-1.50%	-1.77%	-1.90%	-2.00%	-2.06%	-2.07%	-2.06%	-2.07%
Admin, Waste Services	\$30 CO ₂	-0.35%	-0.38%	-0.43%	-0.40%	-0.41%	-0.40%	-0.40%	-0.43%	-0.46%
Admin, Waste Services	\$60 CO ₂	-0.50%	-0.59%	-0.71%	-0.71%	-0.75%	-0.77%	-0.76%	-0.74%	-0.73%
Admin, Waste Services	\$100 CO ₂	-0.91%	-1.09%	-1.28%	-1.35%	-1.41%	-1.45%	-1.45%	-1.43%	-1.44%
Educational Services	\$30 CO ₂	-0.56%	-0.49%	-0.52%	-0.44%	-0.43%	-0.42%	-0.42%	-0.49%	-0.54%
Educational Services	\$60 CO ₂	-0.79%	-0.73%	-0.83%	-0.78%	-0.81%	-0.83%	-0.81%	-0.80%	-0.80%
Educational Services	\$100 CO ₂	-1.47%	-1.46%	-1.63%	-1.67%	-1.73%	-1.78%	-1.79%	-1.78%	-1.82%
Health Care, Social Asst	\$30 CO ₂	-0.40%	-0.35%	-0.37%	-0.32%	-0.32%	-0.31%	-0.32%	-0.36%	-0.39%
Health Care, Social Asst	\$60 CO ₂	-0.56%	-0.51%	-0.57%	-0.53%	-0.55%	-0.57%	-0.56%	-0.56%	-0.57%
Health Care, Social Asst	\$100 CO ₂	-1.07%	-1.05%	-1.15%	-1.19%	-1.24%	-1.29%	-1.31%	-1.31%	-1.35%

Arts, Entertainment, Rec	\$30 CO ₂	-0.53%	-0.47%	-0.50%	-0.42%	-0.41%	-0.39%	-0.39%	-0.44%	-0.49%
Arts, Entertainment, Rec	\$60 CO ₂	-0.74%	-0.70%	-0.79%	-0.73%	-0.76%	-0.77%	-0.74%	-0.72%	-0.71%
Arts, Entertainment, Rec	\$100 CO ₂	-1.39%	-1.40%	-1.55%	-1.58%	-1.63%	-1.66%	-1.65%	-1.63%	-1.64%
Accommodation, Food Services	\$30 CO ₂	-0.61%	-0.52%	-0.53%	-0.44%	-0.42%	-0.40%	-0.39%	-0.45%	-0.48%
Accommodation, Food Services	\$60 CO ₂	-0.90%	-0.81%	-0.87%	-0.79%	-0.80%	-0.80%	-0.75%	-0.72%	-0.70%
Accommodation, Food Services	\$100 CO ₂	-1.61%	-1.54%	-1.65%	-1.64%	-1.66%	-1.67%	-1.64%	-1.60%	-1.60%
Other Services (excl Gov)	\$30 CO ₂	-0.62%	-0.55%	-0.58%	-0.49%	-0.49%	-0.47%	-0.47%	-0.53%	-0.58%
Other Services (excl Gov)	\$60 CO ₂	-0.87%	-0.82%	-0.90%	-0.83%	-0.86%	-0.88%	-0.86%	-0.85%	-0.84%
Other Services (excl Gov)	\$100 CO ₂	-1.67%	-1.64%	-1.78%	-1.81%	-1.86%	-1.90%	-1.90%	-1.88%	-1.91%

Table A25: Change in State Revenues, Scenario 1: No Distribution of Allowances

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
State Revenues	\$30 CO ₂	-1.46%	-1.39%	-1.45%	-1.37%	-1.40%	-1.40%	-1.43%	-1.51%	-1.59%
State Revenues	\$60 CO ₂	-2.42%	-2.38%	-2.52%	-2.47%	-2.54%	-2.59%	-2.59%	-2.60%	-2.61%
State Revenues	\$100 CO ₂	-3.94%	-3.90%	-4.06%	-4.10%	-4.19%	-4.27%	-4.29%	-4.28%	-4.34%
Intergovernmental Revenue	\$30 CO ₂	-0.22%	-0.39%	-0.53%	-0.64%	-0.73%	-0.81%	-0.87%	-0.93%	-1.00%
Intergovernmental Revenue	\$60 CO ₂	-0.37%	-0.66%	-0.91%	-1.11%	-1.28%	-1.43%	-1.55%	-1.65%	-1.73%
Intergovernmental Revenue	\$100 CO ₂	-0.61%	-1.09%	-1.50%	-1.84%	-2.13%	-2.38%	-2.58%	-2.75%	-2.89%
General Sales Tax	\$30 CO ₂	-2.12%	-1.92%	-1.96%	-1.79%	-1.80%	-1.78%	-1.80%	-1.89%	-1.99%
General Sales Tax	\$60 CO ₂	-3.53%	-3.32%	-3.41%	-3.26%	-3.29%	-3.31%	-3.28%	-3.25%	-3.25%
General Sales Tax	\$100 CO ₂	-5.70%	-5.39%	-5.44%	-5.36%	-5.38%	-5.41%	-5.37%	-5.30%	-5.34%
Selective Sales Tax	\$30 CO ₂	-2.12%	-1.92%	-1.96%	-1.79%	-1.80%	-1.78%	-1.80%	-1.89%	-1.99%
Selective Sales Tax	\$60 CO ₂	-3.53%	-3.32%	-3.41%	-3.26%	-3.29%	-3.31%	-3.28%	-3.25%	-3.25%
Selective Sales Tax	\$100 CO ₂	-5.70%	-5.39%	-5.44%	-5.36%	-5.38%	-5.41%	-5.37%	-5.30%	-5.34%
License Taxes	\$30 CO ₂	-2.12%	-1.92%	-1.96%	-1.79%	-1.80%	-1.78%	-1.80%	-1.89%	-1.99%
License Taxes	\$60 CO ₂	-3.53%	-3.32%	-3.41%	-3.26%	-3.29%	-3.31%	-3.28%	-3.25%	-3.25%

License Taxes	\$100 CO ₂	-5.70%	-5.39%	-5.44%	-5.36%	-5.38%	-5.41%	-5.37%	-5.30%	-5.34%
Individual Income Tax	\$30 CO ₂	-1.84%	-1.68%	-1.71%	-1.55%	-1.54%	-1.51%	-1.51%	-1.57%	-1.64%
Individual Income Tax	\$60 CO ₂	-3.05%	-2.89%	-2.97%	-2.81%	-2.81%	-2.80%	-2.74%	-2.69%	-2.66%
Individual Income Tax	\$100 CO ₂	-4.97%	-4.75%	-4.79%	-4.69%	-4.66%	-4.64%	-4.55%	-4.44%	-4.43%
Corporate Income Tax	\$30 CO ₂	-2.29%	-2.08%	-2.11%	-1.91%	-1.91%	-1.87%	-1.88%	-1.98%	-2.07%
Corporate Income Tax	\$60 CO ₂	-3.81%	-3.59%	-3.69%	-3.50%	-3.52%	-3.52%	-3.45%	-3.41%	-3.38%
Corporate Income Tax	\$100 CO ₂	-6.12%	-5.80%	-5.86%	-5.75%	-5.73%	-5.73%	-5.64%	-5.54%	-5.56%
Other Taxes	\$30 CO ₂	-1.70%	-1.55%	-1.58%	-1.43%	-1.44%	-1.41%	-1.42%	-1.48%	-1.56%
Other Taxes	\$60 CO ₂	-2.81%	-2.65%	-2.73%	-2.59%	-2.61%	-2.61%	-2.57%	-2.54%	-2.53%
Other Taxes	\$100 CO ₂	-4.61%	-4.38%	-4.42%	-4.35%	-4.35%	-4.35%	-4.29%	-4.22%	-4.23%
Current Charges	\$30 CO ₂	-1.70%	-1.55%	-1.58%	-1.43%	-1.44%	-1.41%	-1.42%	-1.48%	-1.56%
Current Charges	\$60 CO ₂	-2.81%	-2.65%	-2.73%	-2.59%	-2.61%	-2.61%	-2.57%	-2.54%	-2.53%
Current Charges	\$100 CO ₂	-4.61%	-4.38%	-4.42%	-4.35%	-4.35%	-4.35%	-4.29%	-4.22%	-4.23%
Miscellaneous General Revenue	\$30 CO ₂	-1.70%	-1.55%	-1.58%	-1.43%	-1.44%	-1.41%	-1.42%	-1.48%	-1.56%
Miscellaneous General Revenue	\$60 CO ₂	-2.81%	-2.65%	-2.73%	-2.59%	-2.61%	-2.61%	-2.57%	-2.54%	-2.53%
Miscellaneous General Revenue	\$100 CO ₂	-4.61%	-4.38%	-4.42%	-4.35%	-4.35%	-4.35%	-4.29%	-4.22%	-4.23%

Utility Revenue	\$30 CO ₂	-1.70%	-1.55%	-1.58%	-1.43%	-1.44%	-1.41%	-1.42%	-1.48%	-1.56%
Utility Revenue	\$60 CO ₂	-2.81%	-2.65%	-2.73%	-2.59%	-2.61%	-2.61%	-2.57%	-2.54%	-2.53%
Utility Revenue	\$100 CO ₂	-4.61%	-4.38%	-4.42%	-4.35%	-4.35%	-4.35%	-4.29%	-4.22%	-4.23%
Insurance Trust Revenue	\$30 CO ₂	-1.70%	-1.55%	-1.58%	-1.43%	-1.44%	-1.41%	-1.42%	-1.48%	-1.56%
Insurance Trust Revenue	\$60 CO ₂	-2.81%	-2.65%	-2.73%	-2.59%	-2.61%	-2.61%	-2.57%	-2.54%	-2.53%
Insurance Trust Revenue	\$100 CO ₂	-4.61%	-4.38%	-4.42%	-4.35%	-4.35%	-4.35%	-4.29%	-4.22%	-4.23%

Table A26: Change in State Revenues, Scenario 2: 25- 50% of Allowances Allocated to R&D and Deployment of Renewable Technologies

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
State Revenues	\$30 CO ₂	-1.38%	-1.29%	-1.34%	-1.23%	-1.24%	-1.22%	-1.24%	-1.30%	-1.38%
State Revenues	\$60 CO ₂	-1.86%	-1.74%	-1.81%	-1.70%	-1.71%	-1.71%	-1.69%	-1.68%	-1.67%
State Revenues	\$100 CO ₂	-3.74%	-3.66%	-3.78%	-3.79%	-3.83%	-3.87%	-3.87%	-3.85%	-3.89%
Intergovernmental Revenue	\$30 CO ₂	-0.21%	-0.37%	-0.51%	-0.61%	-0.69%	-0.75%	-0.80%	-0.85%	-0.90%
Intergovernmental Revenue	\$60 CO ₂	-0.29%	-0.50%	-0.69%	-0.83%	-0.94%	-1.03%	-1.10%	-1.16%	-1.20%
Intergovernmental Revenue	\$100 CO ₂	-0.59%	-1.05%	-1.44%	-1.76%	-2.02%	-2.24%	-2.42%	-2.56%	-2.68%
General Sales Tax	\$30 CO ₂	-1.94%	-1.70%	-1.71%	-1.51%	-1.48%	-1.43%	-1.45%	-1.53%	-1.63%
General Sales Tax	\$60 CO ₂	-2.59%	-2.28%	-2.28%	-2.05%	-2.02%	-1.99%	-1.95%	-1.93%	-1.92%
General Sales Tax	\$100 CO ₂	-5.22%	-4.84%	-4.84%	-4.71%	-4.67%	-4.65%	-4.63%	-4.57%	-4.61%
Selective Sales Tax	\$30 CO ₂	-1.94%	-1.70%	-1.71%	-1.51%	-1.48%	-1.43%	-1.45%	-1.53%	-1.63%
Selective Sales Tax	\$60 CO ₂	-2.59%	-2.28%	-2.28%	-2.05%	-2.02%	-1.99%	-1.95%	-1.93%	-1.92%
Selective Sales Tax	\$100 CO ₂	-5.22%	-4.84%	-4.84%	-4.71%	-4.67%	-4.65%	-4.63%	-4.57%	-4.61%
License Taxes	\$30 CO ₂	-1.94%	-1.70%	-1.71%	-1.51%	-1.48%	-1.43%	-1.45%	-1.53%	-1.63%

License Taxes	\$60 CO ₂	-2.59%	-2.28%	-2.28%	-2.05%	-2.02%	-1.99%	-1.95%	-1.93%	-1.92%
License Taxes	\$100 CO ₂	-5.22%	-4.84%	-4.84%	-4.71%	-4.67%	-4.65%	-4.63%	-4.57%	-4.61%
Individual Income Tax	\$30 CO ₂	-1.78%	-1.61%	-1.62%	-1.43%	-1.40%	-1.34%	-1.33%	-1.38%	-1.45%
Individual Income Tax	\$60 CO ₂	-2.41%	-2.18%	-2.19%	-1.99%	-1.95%	-1.90%	-1.83%	-1.77%	-1.73%
Individual Income Tax	\$100 CO ₂	-4.82%	-4.55%	-4.56%	-4.41%	-4.34%	-4.27%	-4.16%	-4.04%	-4.01%
Corporate Income Tax	\$30 CO ₂	-2.23%	-1.99%	-1.99%	-1.77%	-1.73%	-1.67%	-1.65%	-1.72%	-1.80%
Corporate Income Tax	\$60 CO ₂	-3.04%	-2.71%	-2.72%	-2.47%	-2.43%	-2.37%	-2.27%	-2.20%	-2.15%
Corporate Income Tax	\$100 CO ₂	-5.97%	-5.59%	-5.59%	-5.41%	-5.33%	-5.26%	-5.13%	-4.99%	-4.97%
Other Taxes	\$30 CO ₂	-1.66%	-1.49%	-1.50%	-1.34%	-1.32%	-1.28%	-1.28%	-1.33%	-1.40%
Other Taxes	\$60 CO ₂	-2.23%	-2.01%	-2.03%	-1.86%	-1.84%	-1.81%	-1.76%	-1.72%	-1.69%
Other Taxes	\$100 CO ₂	-4.50%	-4.23%	-4.24%	-4.13%	-4.09%	-4.06%	-3.98%	-3.89%	-3.88%
Current Charges	\$30 CO ₂	-1.66%	-1.49%	-1.50%	-1.34%	-1.32%	-1.28%	-1.28%	-1.33%	-1.40%
Current Charges	\$60 CO ₂	-2.23%	-2.01%	-2.03%	-1.86%	-1.84%	-1.81%	-1.76%	-1.72%	-1.69%
Current Charges	\$100 CO ₂	-4.50%	-4.23%	-4.24%	-4.13%	-4.09%	-4.06%	-3.98%	-3.89%	-3.88%
Miscellaneous General Revenue	\$30 CO ₂	-1.66%	-1.49%	-1.50%	-1.34%	-1.32%	-1.28%	-1.28%	-1.33%	-1.40%
Miscellaneous General Revenue	\$60 CO ₂	-2.23%	-2.01%	-2.03%	-1.86%	-1.84%	-1.81%	-1.76%	-1.72%	-1.69%

Miscellaneous General Revenue	\$100 CO ₂	-4.50%	-4.23%	-4.24%	-4.13%	-4.09%	-4.06%	-3.98%	-3.89%	-3.88%
Utility Revenue	\$30 CO ₂	-1.66%	-1.49%	-1.50%	-1.34%	-1.32%	-1.28%	-1.28%	-1.33%	-1.40%
Utility Revenue	\$60 CO ₂	-2.23%	-2.01%	-2.03%	-1.86%	-1.84%	-1.81%	-1.76%	-1.72%	-1.69%
Utility Revenue	\$100 CO ₂	-4.50%	-4.23%	-4.24%	-4.13%	-4.09%	-4.06%	-3.98%	-3.89%	-3.88%
Insurance Trust Revenue	\$30 CO ₂	-1.66%	-1.49%	-1.50%	-1.34%	-1.32%	-1.28%	-1.28%	-1.33%	-1.40%
Insurance Trust Revenue	\$60 CO ₂	-2.23%	-2.01%	-2.03%	-1.86%	-1.84%	-1.81%	-1.76%	-1.72%	-1.69%
Insurance Trust Revenue	\$100 CO ₂	-4.50%	-4.23%	-4.24%	-4.13%	-4.09%	-4.06%	-3.98%	-3.89%	-3.88%

Table A27: Change in State Revenues, Scenario 3: 50% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
State Revenues	\$30 CO ₂	-0.38%	-0.31%	-0.39%	-0.33%	-0.38%	-0.40%	-0.45%	-0.55%	-0.65%
State Revenues	\$60 CO ₂	-0.33%	-0.31%	-0.49%	-0.50%	-0.62%	-0.73%	-0.80%	-0.86%	-0.93%
State Revenues	\$100 CO ₂	-1.08%	-1.14%	-1.45%	-1.63%	-1.83%	-2.04%	-2.17%	-2.27%	-2.43%
Intergovernmental Revenue	\$30 CO ₂	-0.17%	-0.29%	-0.40%	-0.48%	-0.55%	-0.60%	-0.64%	-0.69%	-0.74%
Intergovernmental Revenue	\$60 CO ₂	-0.26%	-0.46%	-0.65%	-0.79%	-0.91%	-1.01%	-1.10%	-1.17%	-1.23%
Intergovernmental Revenue	\$100 CO ₂	-0.47%	-0.83%	-1.15%	-1.41%	-1.64%	-1.84%	-2.01%	-2.15%	-2.27%
General Sales Tax	\$30 CO ₂	-1.92%	-1.72%	-1.74%	-1.57%	-1.58%	-1.55%	-1.57%	-1.66%	-1.76%
General Sales Tax	\$60 CO ₂	-3.08%	-2.86%	-2.94%	-2.78%	-2.81%	-2.83%	-2.79%	-2.77%	-2.77%
General Sales Tax	\$100 CO ₂	-5.09%	-4.78%	-4.84%	-4.76%	-4.79%	-4.82%	-4.79%	-4.74%	-4.78%
Selective Sales Tax	\$30 CO ₂	-1.92%	-1.72%	-1.74%	-1.57%	-1.58%	-1.55%	-1.57%	-1.66%	-1.76%
Selective Sales Tax	\$60 CO ₂	-3.08%	-2.86%	-2.94%	-2.78%	-2.81%	-2.83%	-2.79%	-2.77%	-2.77%
Selective Sales Tax	\$100 CO ₂	-5.09%	-4.78%	-4.84%	-4.76%	-4.79%	-4.82%	-4.79%	-4.74%	-4.78%
License Taxes	\$30 CO ₂	-1.92%	-1.72%	-1.74%	-1.57%	-1.58%	-1.55%	-1.57%	-1.66%	-1.76%
License Taxes	\$60 CO ₂	-3.08%	-2.86%	-2.94%	-2.78%	-2.81%	-2.83%	-2.79%	-2.77%	-2.77%

License Taxes	\$100 CO ₂	-5.09%	-4.78%	-4.84%	-4.76%	-4.79%	-4.82%	-4.79%	-4.74%	-4.78%
Individual Income Tax	\$30 CO ₂	-1.63%	-1.46%	-1.48%	-1.32%	-1.31%	-1.27%	-1.27%	-1.33%	-1.41%
Individual Income Tax	\$60 CO ₂	-2.59%	-2.41%	-2.47%	-2.31%	-2.31%	-2.30%	-2.25%	-2.21%	-2.18%
Individual Income Tax	\$100 CO ₂	-4.36%	-4.11%	-4.15%	-4.06%	-4.04%	-4.03%	-3.96%	-3.87%	-3.88%
Corporate Income Tax	\$30 CO ₂	-2.09%	-1.88%	-1.91%	-1.72%	-1.71%	-1.68%	-1.69%	-1.78%	-1.88%
Corporate Income Tax	\$60 CO ₂	-3.36%	-3.15%	-3.24%	-3.06%	-3.08%	-3.09%	-3.03%	-2.99%	-2.96%
Corporate Income Tax	\$100 CO ₂	-5.52%	-5.21%	-5.28%	-5.19%	-5.19%	-5.20%	-5.14%	-5.05%	-5.08%
Other Taxes	\$30 CO ₂	-1.54%	-1.38%	-1.40%	-1.24%	-1.24%	-1.21%	-1.22%	-1.28%	-1.36%
Other Taxes	\$60 CO ₂	-2.46%	-2.27%	-2.33%	-2.18%	-2.19%	-2.19%	-2.15%	-2.12%	-2.10%
Other Taxes	\$100 CO ₂	-4.13%	-3.87%	-3.90%	-3.82%	-3.82%	-3.83%	-3.78%	-3.71%	-3.73%
Current Charges	\$30 CO ₂	-1.54%	-1.38%	-1.40%	-1.24%	-1.24%	-1.21%	-1.22%	-1.28%	-1.36%
Current Charges	\$60 CO ₂	-2.46%	-2.27%	-2.33%	-2.18%	-2.19%	-2.19%	-2.15%	-2.12%	-2.10%
Current Charges	\$100 CO ₂	-4.13%	-3.87%	-3.90%	-3.82%	-3.82%	-3.83%	-3.78%	-3.71%	-3.73%
Miscellaneous General Revenue	\$30 CO ₂	12.29%	11.99%	11.52%	11.23%	10.78%	10.40%	10.02%	9.59%	9.19%
Miscellaneous General Revenue	\$60 CO ₂	23.79%	22.82%	21.68%	20.72%	19.66%	18.67%	17.70%	16.77%	15.96%
Miscellaneous General Revenue	\$100 CO ₂	31.72%	29.63%	27.00%	24.81%	22.94%	21.06%	19.37%	17.86%	16.38%

Utility Revenue	\$30 CO ₂	-1.54%	-1.38%	-1.40%	-1.24%	-1.24%	-1.21%	-1.22%	-1.28%	-1.36%
Utility Revenue	\$60 CO ₂	-2.46%	-2.27%	-2.33%	-2.18%	-2.19%	-2.19%	-2.15%	-2.12%	-2.10%
Utility Revenue	\$100 CO ₂	-4.13%	-3.87%	-3.90%	-3.82%	-3.82%	-3.83%	-3.78%	-3.71%	-3.73%
Insurance Trust Revenue	\$30 CO ₂	-1.54%	-1.38%	-1.40%	-1.24%	-1.24%	-1.21%	-1.22%	-1.28%	-1.36%
Insurance Trust Revenue	\$60 CO ₂	-2.46%	-2.27%	-2.33%	-2.18%	-2.19%	-2.19%	-2.15%	-2.12%	-2.10%
Insurance Trust Revenue	\$100 CO ₂	-4.13%	-3.87%	-3.90%	-3.82%	-3.82%	-3.83%	-3.78%	-3.71%	-3.73%

Table A28: Change in State Revenues, Scenario 4: 95% of Allowances Used to Fund State Government General Fund Activities

Variable	CO ₂ price	2012	2013	2014	2015	2016	2017	2018	2019	2020
State Revenues	\$30 CO ₂	0.55%	0.62%	0.53%	0.59%	0.52%	0.48%	0.41%	0.30%	0.18%
State Revenues	\$60 CO ₂	1.44%	1.45%	1.23%	1.19%	1.02%	0.86%	0.74%	0.62%	0.51%
State Revenues	\$100 CO ₂	1.33%	1.22%	0.78%	0.49%	0.19%	-0.12%	-0.36%	-0.55%	-0.80%
Intergovernmental Revenue	\$30 CO ₂	-0.12%	-0.20%	-0.28%	-0.32%	-0.36%	-0.40%	-0.42%	-0.46%	-0.49%
Intergovernmental Revenue	\$60 CO ₂	-0.17%	-0.29%	-0.41%	-0.49%	-0.57%	-0.63%	-0.69%	-0.74%	-0.78%
Intergovernmental Revenue	\$100 CO ₂	-0.34%	-0.59%	-0.83%	-1.03%	-1.20%	-1.36%	-1.49%	-1.61%	-1.71%
General Sales Tax	\$30 CO ₂	-1.70%	-1.49%	-1.51%	-1.34%	-1.34%	-1.31%	-1.33%	-1.42%	-1.51%
General Sales Tax	\$60 CO ₂	-2.67%	-2.44%	-2.51%	-2.35%	-2.37%	-2.39%	-2.36%	-2.34%	-2.34%
General Sales Tax	\$100 CO ₂	-4.54%	-4.23%	-4.29%	-4.22%	-4.25%	-4.29%	-4.27%	-4.22%	-4.28%
Selective Sales Tax	\$30 CO ₂	-1.70%	-1.49%	-1.51%	-1.34%	-1.34%	-1.31%	-1.33%	-1.42%	-1.51%
Selective Sales Tax	\$60 CO ₂	-2.67%	-2.44%	-2.51%	-2.35%	-2.37%	-2.39%	-2.36%	-2.34%	-2.34%
Selective Sales Tax	\$100 CO ₂	-4.54%	-4.23%	-4.29%	-4.22%	-4.25%	-4.29%	-4.27%	-4.22%	-4.28%
License Taxes	\$30 CO ₂	-1.70%	-1.49%	-1.51%	-1.34%	-1.34%	-1.31%	-1.33%	-1.42%	-1.51%
License Taxes	\$60 CO ₂	-2.67%	-2.44%	-2.51%	-2.35%	-2.37%	-2.39%	-2.36%	-2.34%	-2.34%

License Taxes	\$100 CO ₂	-4.54%	-4.23%	-4.29%	-4.22%	-4.25%	-4.29%	-4.27%	-4.22%	-4.28%
Individual Income Tax	\$30 CO ₂	-1.42%	-1.23%	-1.24%	-1.07%	-1.06%	-1.02%	-1.02%	-1.09%	-1.17%
Individual Income Tax	\$60 CO ₂	-2.18%	-1.98%	-2.03%	-1.86%	-1.86%	-1.86%	-1.81%	-1.77%	-1.76%
Individual Income Tax	\$100 CO ₂	-3.80%	-3.53%	-3.57%	-3.48%	-3.47%	-3.48%	-3.43%	-3.36%	-3.38%
Corporate Income Tax	\$30 CO ₂	-1.88%	-1.67%	-1.69%	-1.50%	-1.50%	-1.46%	-1.47%	-1.57%	-1.66%
Corporate Income Tax	\$60 CO ₂	-2.96%	-2.75%	-2.84%	-2.66%	-2.69%	-2.70%	-2.64%	-2.61%	-2.59%
Corporate Income Tax	\$100 CO ₂	-4.97%	-4.68%	-4.77%	-4.68%	-4.70%	-4.73%	-4.68%	-4.61%	-4.65%
Other Taxes	\$30 CO ₂	-1.38%	-1.20%	-1.20%	-1.04%	-1.03%	-1.00%	-1.01%	-1.07%	-1.14%
Other Taxes	\$60 CO ₂	-2.14%	-1.93%	-1.96%	-1.80%	-1.81%	-1.80%	-1.76%	-1.74%	-1.72%
Other Taxes	\$100 CO ₂	-3.70%	-3.41%	-3.43%	-3.34%	-3.34%	-3.36%	-3.32%	-3.26%	-3.29%
Current Charges	\$30 CO ₂	-1.38%	-1.20%	-1.20%	-1.04%	-1.03%	-1.00%	-1.01%	-1.07%	-1.14%
Current Charges	\$60 CO ₂	-2.14%	-1.93%	-1.96%	-1.80%	-1.81%	-1.80%	-1.76%	-1.74%	-1.72%
Current Charges	\$100 CO ₂	-3.70%	-3.41%	-3.43%	-3.34%	-3.34%	-3.36%	-3.32%	-3.26%	-3.29%
Miscellaneous General Revenue	\$30 CO ₂	23.95%	23.34%	22.49%	21.85%	21.02%	20.30%	19.60%	18.89%	18.20%
Miscellaneous General Revenue	\$60 CO ₂	46.00%	44.22%	42.15%	40.31%	38.36%	36.53%	34.71%	33.00%	31.46%
Miscellaneous General Revenue	\$100 CO ₂	62.16%	58.31%	53.43%	49.36%	45.91%	42.43%	39.26%	36.45%	33.69%

Utility Revenue	\$30 CO ₂	-1.38%	-1.20%	-1.20%	-1.04%	-1.03%	-1.00%	-1.01%	-1.07%	-1.14%
Utility Revenue	\$60 CO ₂	-2.14%	-1.93%	-1.96%	-1.80%	-1.81%	-1.80%	-1.76%	-1.74%	-1.72%
Utility Revenue	\$100 CO ₂	-3.70%	-3.41%	-3.43%	-3.34%	-3.34%	-3.36%	-3.32%	-3.26%	-3.29%
Insurance Trust Revenue	\$30 CO ₂	-1.38%	-1.20%	-1.20%	-1.04%	-1.03%	-1.00%	-1.01%	-1.07%	-1.14%
Insurance Trust Revenue	\$60 CO ₂	-2.14%	-1.93%	-1.96%	-1.80%	-1.81%	-1.80%	-1.76%	-1.74%	-1.72%
Insurance Trust Revenue	\$100 CO ₂	-3.70%	-3.41%	-3.43%	-3.34%	-3.34%	-3.36%	-3.32%	-3.26%	-3.29%

Table A29: Change in Population Levels (in Thousands), All Scenarios Compared to Control Scenario

Variable	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Control Scenario	6995.264	7187.512	7383.131	7580.274	7772.642	7960.481	8141.042	8313.756	8478.744	8636.713
Scenario 1:\$30 CO ₂		7171.617	7354.524	7539.793	7722.86	7902.255	8075.461	8241.441	8399.68	8550.705
Scenario 1:\$60 CO ₂		7161.153	7334.806	7511.249	7686.256	7858.287	8024.563	8184.822	8338.922	8487.216
Scenario 1:\$100 CO ₂		7143.679	7302.792	7466.404	7629.276	7790.569	7947.213	8099.015	8245.983	8387.547
Scenario 2:\$30 CO ₂		7172.144	7355.67	7541.667	7725.579	7905.929	8080.197	8247.244	8406.555	8558.653
Scenario 2:\$60 CO ₂		7166.726	7345.931	7527.958	7708.448	7885.804	8057.217	8222.223	8380.703	8533.047
Scenario 2:\$100 CO ₂		7145.089	7305.785	7471.173	7636.022	7799.492	7958.474	8112.537	8261.703	8405.394
Scenario 3:\$30 CO ₂		7175.246	7361.389	7549.594	7735.310	7917.067	8092.372	8260.215	8420.105	8572.593
Scenario 3:\$60 CO ₂		7168.616	7348.877	7531.274	7711.587	7888.29	8058.647	8222.423	8379.541	8530.425
Scenario 3:\$100 CO ₂		7154.026	7322.061	7493.345	7662.78	7829.667	7990.972	8146.607	8296.701	8440.762
Scenario 4:\$30 CO ₂		7178.737	7368.029	7559.112	7747.436	7931.523	8108.904	8278.594	8440.124	8594.069
Scenario 4:\$60 CO ₂		7175.277	7361.497	7549.272	7734.378	7915.306	8089.354	8256.313	8416.159	8569.385
Scenario 4:\$100 CO ₂		7163.267	7339.353	7517.57	7692.944	7864.896	8030.426	8189.536	8342.462	8488.787

Table A30: Change in Migration Levels (in Thousands), All Scenarios Compared to Control Scenario

Variable	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Control Scenario	129.064	125.154	125.586	124.375	117.029	110.298	101.104	91.609	82.531	74.403
Scenario 1:\$30 CO ₂		109.473	113.465	113.402	108.878	103.192	95.24	86.485	77.494	69.268
Scenario 1:\$60 CO ₂		99.15	104.611	105.206	101.652	96.834	89.463	82.034	74.697	67.901
Scenario 1:\$100 CO ₂		81.91	90.728	93.379	90.815	87.648	81.588	75.495	69.599	63.287
Scenario 2:\$30 CO ₂		109.993	114.062	114.09	109.663	104.065	96.198	87.422	78.412	70.168
Scenario 2:\$60 CO ₂		104.647	109.942	110.427	106.635	101.534	93.862	85.943	78.155	70.962
Scenario 2:\$100 CO ₂		83.301	92.254	95.053	92.645	89.626	83.674	77.453	71.447	65.023
Scenario 3:\$30 CO ₂		113.053	116.56	116.122	111.244	105.214	96.954	87.928	78.698	70.266
Scenario 3:\$60 CO ₂		106.512	110.933	110.7155	106.377	100.817	92.768	84.710	76.825	69.573
Scenario 3:\$100 CO ₂		92.119	99.257	100.448	96.607	92.34	85.25	78.263	71.618	64.661
Scenario 4:\$30 CO ₂		116.497	119.575	118.7885	113.573	107.213	98.655	89.364	79.900	71.264
Scenario 4:\$60 CO ₂		113.082	116.637	115.693	110.649	104.422	95.759	87.134	78.753	71.087
Scenario 4:\$100 CO ₂		101.234	106.956	106.838	101.852	96.594	88.574	80.777	73.452	65.911

Technical Appendix

TA1 The REMI Model

REMI is an economic-demographic forecasting and simulation model developed by Regional Economic Models Inc. REMI is designed to forecast the impact of public policies and external events on an economy and its population. The REMI model is recognized by the business and academic community as the leading regional forecast/simulation tool available.

Unlike most other regional economic impact models, REMI is a dynamic model that produces integrated multiyear forecasts and accounts for dynamic feedbacks among its economic and demographic variables. The REMI model is also an "open" model in that it explicitly accounts for trade and migration flows in and out of the state. A complete explanation of the model and discussion of the empirical estimation of the parameters/equations are given in *Regional Economic Modeling: A Systematic Approach to Economic Forecasting and Policy Analysis* (Treyz, 1993) and *Policy Insight 9.5: Model Documentation* (REMI, 2007).

The operation of the REMI model has been developed to facilitate the simulation of policy changes, such as a tax increase for example, or many other types of events – anything from the opening of a new business to closure of a military base to a natural disaster. The model's construction includes a large set of policy variables that are under the control of the model's operators. This set of policy variables includes 33 different types of economic and demographic variables and many of those can be specified to affect specific industries. In the baseline forecast or control, the values of all the policy variables are unchanged. To simulate the impact of a policy change or other event, a change in one or more of the policy variables is entered into the model and a new forecast is generated. The REMI model then automatically produces a detailed set of simulation results showing the differences in the values of each economic variable between the control and the alternative forecast.

The specific REMI model used for this analysis was Policy Insight Model Version 9.5 of the Arizona economy leased from Regional Economic Models Inc. by a consortium of State agencies, including Arizona State University, for economic forecasting and policy analysis. The

9.5 version was delivered with national and local datasets with data through 2005 and also with national and local baseline forecasts prepared by Regional Economic Models Inc. The REMI model incorporates procedures for updating the datasets and the baseline forecasts with more recent data. The research team performed these procedures to prepare an updated baseline forecast for the Arizona economy, updating the REMI model with data up to 2007 and comparable estimates for 2008 from national and state sources. The detailed method and data sources used in this updating process are summarized in the Technical Appendix.

TA2 Policy Variables

To evaluate the economic impacts that the imposition of a GHG emission allowance trading program could have in Arizona first involves identifying what direct impacts its implementation would have on the various parts of the economy.

For the purposes of this study, the assumptions are made that the demand for the CO₂ allowances will exceed the available supply and that all allowances will be sold at auction as the means of allocating them among those wishing to acquire allowances. Given these assumptions, the electric and natural gas utilities and the distributors of gasoline, diesel, and other fuels will be required to purchase allowances in order to distribute electricity and carbon-based fuels. The cost of the allowances will have the following primary direct effects:

1. The cost of production/doing business for the utilities and fuel distributors will increase by the cost of the allowances.
2. The increased cost of supplying electricity and fuels will increase their market prices, the magnitude of the price increases determined by (a) the amount of CO₂ emitted per unit of product and (b) the elasticities of supply and demand for each product.
3. The proceeds of the sale of the CO₂ allowances would also have a direct impact to the extent that they are recycled in some way back into the Arizona economy.

In order to make use of the REMI model to estimate the economic impacts of the GHG emission allowance trading program, these direct effects must be specified in terms of numeric changes in specific policy variables in the REMI model.

TA2.1 Electricity/Fuel Price Increases

The increases in the price of electricity and fuels caused by the imposition of a GHG emission allowance trading program would impact all buyers of these products. This impact was operationalized in the REMI model as changes in two sets of policy variables:

1. Business sector – for the business sector, the price increases were incorporated into the model as increases in fuel costs. For the fuel cost policy variable, the REMI model differentiates between industrial and commercial uses. The model has three separate fuel cost categories in its set of policy variables – electricity, natural gas, and residual fuels.
2. Household sector – for households, the price increases were input in the model as changes in the appropriate categories in the set of consumer price variables.

The numeric estimates of the electricity price increases were developed by EPRI in their *Collaborative EPRI Analysis of CO₂ Price Impacts on Western Power Markets* (2008). The EPRI study calculated alternative sets of wholesale market electricity prices based on a range of plausible assumptions for the cost of the CO₂ allowances. For the three allowance price scenarios included in this analysis (\$30, \$60, and \$100 per ton), the EPRI estimates of electricity price increases for those price levels were included in the simulation. It is important to notice that the EPRI study did not attempt to estimate what the market price of the allowances would be, but instead evaluated what the effects on power markets would result from a range of alternative prices for the allowances. The price data for the other types of fuel were estimated based on the amount of CO₂ that would be emitted by its combustion and the cost of the allowances. Table 1 lists the percentage increases in the prices of electricity, natural gas, residual fuels, and gasoline calculated from these data for each year of the study period used as the inputs in the REMI simulations.

Table TA1: Percentage Increase in Fuel Costs

\$30 Price for CO₂ Allowances				
Year	Electricity	Natural Gas	Residual Oil	Gasoline
2012	26%	13%	21%	9%
2013	19%	13%	21%	9%
2014	17%	12%	21%	9%
2015	12%	11%	20%	9%
2016	11%	11%	20%	9%
2017	10%	10%	19%	8%
2018	10%	9%	19%	8%
2019	13%	8%	18%	8%
2020	14%	7%	18%	8%

\$60 Price for CO₂ Allowances				
Year	Electricity	Natural Gas	Residual Oil	Gasoline
2012	53%	27%	42%	18%
2013	39%	26%	42%	18%
2014	36%	24%	41%	18%
2015	29%	23%	40%	18%
2016	28%	21%	39%	17%
2017	27%	20%	38%	17%
2018	23%	18%	37%	17%
2019	23%	16%	36%	16%
2020	22%	14%	35%	16%

\$100 Price for CO₂ Allowances				
Year	Electricity	Natural Gas	Residual Oil	Gasoline
2012	90%	45%	70%	30%
2013	70%	43%	70%	30%
2014	65%	41%	68%	29%
2015	56%	38%	67%	29%
2016	54%	35%	66%	29%
2017	52%	33%	63%	28%
2018	50%	30%	62%	28%
2019	48%	27%	60%	27%
2020	50%	23%	58%	27%

Source: Authors' Calculations

TA2.2 Cost of Production

The impact of having to purchase the allowances would fall on two sectors - the Utility sector and the Wholesale Trade sector. The total cost of the allowances was allocated between the sectors based on the share of total energy consumed by transportation (EIA State Energy Profile, 2009).

Table 2 lists the estimated value of the allowances for each year of the study period for each of the three prices of CO₂ allowances.

Table TA2: Total Value of the Emission Allowances (Millions 2006\$)

Year	\$30 CO₂ Price	\$60 CO₂ Price	\$100 CO₂ Price
2012	1,413.89	2,707.33	3,761.80
2013	1,413.57	2,677.98	3,634.42
2014	1,411.13	2,646.89	3,462.59
2015	1,407.88	2,610.14	3,317.95
2016	1,401.49	2,573.18	3,204.74
2017	1,395.93	2,533.61	3,074.09
2018	1,391.00	2,481.67	2,943.17
2019	1,386.89	2,431.09	2,822.91
2020	1,381.80	2,386.20	2,702.36

TA2.3 Distribution of the Proceeds from Sale of the Allowances

For the purposes of this analysis, four alternative policy scenarios related to the use of the proceeds from the sale of the allowances were developed:

1. Scenario 1 assumes no distribution of the proceeds flow back into the state's economy. Thus, this scenario focuses on the impacts that the increased cost of production and the price increases for electricity and fuels would have on the state's economy.
2. Scenario 2 assumes that a portion of the proceeds from the allowances would be used to fund research, development and deployment of renewable energy in Arizona. Given the current paucity of production facilities for renewable energy equipment currently in the state, the portion of allowances distributed to this purpose starts at 25 percent in 2012 and is increased by five percentage points per year until it reaches 50 percent in 2017, and it remains at 50 percent for 2018 through 2020. This assumption recognizes the fact that, especially in the early years of the program, allowance proceeds will be paid to out-of-state manufacturers and project developers. It is a debatable question as to how much of the investment in renewable energy equipment may ever be captured by manufacturing facilities employing Arizona workers. These funds were assumed to be allocated in the following manner: 25 percent of the funding was allocated to research

and development and the remaining 75 percent was allocated to the development of new wind and solar thermal electric generating capacity to replace existing CO₂-emitting plants.²⁰

3. Scenario 3 assumes that one-half of the proceeds from the allowances would be used to support the state's General Fund budget.
4. Scenario 4 - 95 percent of the proceeds from the allowances would be used to support the state's General Fund budget.²¹

TA3 Effects Not Incorporated into the Analysis

The REMI simulations conducted for this analysis do not incorporate all of the effects that the imposition of a GHG emission allowance trading program would have on the Arizona economy. First, the structure of the REMI model does not allow some of the effects that the GHG emission allowance trading program would have on the Arizona economy to be included in the analysis. In particular, all national variables serving as explanatory variables in the Arizona model are treated as exogenous factors. This means that any feedbacks of from changes in Arizona economic variables on the national economy are not captured by the REMI model. Secondly, to make the analysis tractable, the set of assumptions used in this analysis to characterize the direct impacts have been simplified and do not reflect the true complexity of all the effects that such a program would have on the state's economy.

TA4 Interpreting the Results

Economic impacts are measured as changes in the level of economic activity (the single summary measure of the overall impact) and/or the changes in specific economic measures that are attributable to some event or policy change. Economists distinguish between the direct impacts and the total impacts. The direct impacts are changes in the economy that are the direct result of the event or policy change. In this study, those direct impacts are the changes in the

²⁰ Consistent with CPUC Decision 07-09-042.

²¹ 5% of the revenues are assumed to be allocated to administrating the program. This is consistent with reported administrative costs for other similar programs (Regional Greenhouse Gas Initiative).

policy variables in the REMI simulations – increases in electricity and fuel prices, increases in the costs of production for the utility and wholesale trade sectors, expenditures on research & development and investments in solar and wind power plants, tax cuts or additional state revenues. The total impacts of an event/policy change are the final changes in all of the diverse parts of the economy after all of the indirect effects of the direct impacts have worked their ways through the economy. As explained above, the REMI model automatically provides detailed estimates of the many dimensions of the total impacts through a comparison of the results of the policy scenario forecast with the baseline or control forecast.

TA5 Updating of the Baseline or Control Forecast

The specific REMI model used for this analysis was Policy Insight Model Version 9.5 for the Arizona economy. The 9.5 version was delivered with national and local datasets with data through 2005 and also with national and local baseline forecasts prepared by Regional Economic Models Inc. The REMI model incorporates procedures for updating the datasets and the baseline forecasts with more recent data. The research team performed these procedures to prepare an updated baseline forecast for the Arizona economy. In practice, the methodology requires first updating the national baseline forecast since forecast values of national economic variables are important inputs to the state forecast.

The national forecast was updated by using 2006 and 2007 data from the U.S. Bureau of Economic Analysis, compatible estimates of the 2008 employment numbers based on data from the U.S. Bureau of Labor Statistics, and forecast data for the 2009–2017 period from the latest available Global Insight national forecast (February 2009). The baseline forecast of the Arizona model was updated based on employment data for 2006 and 2007 from the U. S. Bureau of Economic Analysis, compatible estimates for 2008 based on data from the Arizona Department of Commerce, and state revenue and expenditure data from the Government Finance data compiled the U.S. Census Bureau, supplemented with data from the Arizona Department of Revenue and the Arizona Joint Legislative Budget Committee.

TA6 Development of the Policy Scenarios

Evaluation of the economic impacts of a GHG emission allowance trading program involves specifying the direct impacts its implementation would have on the Arizona economy. As discussed in the text, the following direct effects were specified:

1. The cost of production/doing business for the utilities and fuel distributors would increase by the cost of the allowances.
2. The increased cost of supplying electricity and fuels would increase their market prices.
3. The proceeds of the sale of the CO₂ allowances would also have a direct impact to the extent that they were recycled in some way back into the Arizona economy.

To estimate the economic impacts of the GHG emission allowance trading program, these direct effects must be specified in terms of numeric changes in specific policy variables in the REMI model.

TA6.1 Electricity/Fuel Price Increases

The increases in the price of electricity and fuels were incorporated into the REMI model as changes in the following policy variables:

1. Business sector – For the business sector, the price increases were inputted into the model as increases in fuel costs. For the Fuel Cost policy variable, six sets of price change variables were needed: industrial electricity, commercial electricity, industrial natural gas, commercial natural gas, industrial residual oil, commercial residual oil. The price changes were specified in terms of percentage changes for each year of the forecast period.
2. Household sector – For households, the price increases were inputted in the model as percent changes in the prices of electricity, natural gas, and residual oil in the fuel oil and coal and household operations categories and gasoline and residual oil in the gasoline and oil category in the set of consumer price variables.

TA6.2 Cost of Production

The impact of having to purchase the allowances would fall on two sectors – the Utility sector and the Wholesale Trade sector. The total cost of the allowances was allocated between the sectors based on the share of total energy consumed by transportation (EIA State Energy Profile 2009) – 64 percent for the Utility sector, 36 percent for Wholesale. The numeric estimates of the aggregate proceeds from the auctioned allowances for the Arizona economy were based on an estimated amount of emissions and the three price scenarios.

TA6.3 Distribution of the Proceeds from Sale of the Allowances

For the purposes of this analysis, four alternative policy scenarios related to the use of the proceeds from the sale of the allowances were developed:

A2.3.1 Scenario 1 assumes no distribution of the proceeds flow back into the state’s economy.

A2.3.2 Scenario 2 assumes that a portion of the proceeds from the allowances would be used to fund research, development and deployment of renewable energy in Arizona. This proportion started at 25 percent in 2012 and was increased by five percentage points per year until it reached 50 percent in 2017, and it remained at 50 percent for 2018 through 2020.

One quarter of the funding was allocated to research and development. This was input as a dollar amount in 2006\$ each year of the forecast period as an increase in demand for Scientific R&D services as increases in the Exogenous Industry Demand policy variable.

The remaining three quarters was allocated to the development of new wind and solar thermal electric generating capacity to replace existing CO₂-emitting plants. It was assumed that the output of these renewable plants replace the output of carbon-generating plants rather than increasing the aggregate production capacity of the utility sector. The overall funds were split in the following manner:

1. A 50/50 split between solar and wind power;
2. Construction cost per kWh based on information from the *2007 Arizona Renewable Energy Assessment* (Black & Veatch 2007), with the investment spending implemented as increases in Exogenous Industry Demand policy variables allocated in the following manner - 60 percent generating equipment (NAICS 3336 - Engine, turbine, power transmission equipment); 10 percent site preparation (Construction); 5% building construction (Construction); 5% interconnection (NAICS 3336); 10% installation labor (Construction); 10% other (split between professional/technical services; administrative services; insurance; taxes). This allocation scheme was based on Sedano and Murray (2005).
3. Once wind and solar plants were built (assuming one year lag), some of the funds allocated to investment were used for O&M costs computed using the following parameters. This portion grew over time. O&M costs were based on information from the *2007 Arizona Renewable Energy Assessment* (Black & Veatch 2007) - for wind: - fixed - \$28/kW; variable - \$8/MWh; for solar - variable - \$22.50/MWh. These O&M costs were input as expenditures in Exogenous Industry Demand policy variables in the following manner - 60 percent labor (construction); 12 percent equipment (NAICS 3336); 15 percent taxes; 1 percent insurance; 12 percent professional services. The allocation scheme was based on Sedano and Murray (2005).

A2.3.3 Scenario 3 assumes that one-half of the proceeds from the allowances would be used to support the state's General Fund budget. There were actually two sub-scenarios, since the funds could be allocated to either support government expenditures or to allow tax reductions. In scenario 3a, the additional funds were used to support state government spending and input as a dollar amount in 2006\$ as an increase in the State Government spending policy variable. In scenario 3b, the additional funds were used to support a cut in personal taxes and input as a dollar amount (2006\$) decrease in the Personal Taxes policy variable. The REMI results for the two sub-scenarios averaged to produce the figures reported for scenario 3.

A2.3.4 Scenario 4 assumes that 95 percent of the proceeds from the allowances would be used to support the state's General Fund budget. There were actually two sub-scenarios, since the funds could be allocated to either support government expenditures or to allow tax reductions. In scenario 4a, the additional funds were used to support state government spending and input as a dollar amount in 2006\$ as an increase in the State Government spending policy variable. In scenario 4b, the additional funds were used to support a cut in personal taxes and input as a dollar amount (2006\$) decrease in the Personal Taxes policy variable. The REMI results for the two sub-scenarios averaged to produce the figures reported for scenario 4.

TA6.4 Energy-Intensity Measure

The energy-intensity measure is the percent change in production costs that would result from a 20 percent increase in fuel costs for 64 of the 66 private sector industries in the REMI Arizona model. This variable was calculated by conducting a simulation in which a 20 percent increase was input for each of the six components of the Fuel Cost policy variable for the business sector. This measure for two of the 66 industries were not reported or used in the analysis. The Utilities sector was not included given its direct connection with the production and distribution of fuels/energy. The household sector was the other REMI industry excluded.

TA6.5 CO₂ Emissions

The estimates of CO₂ emissions for the United States and the seven WCI-member states were calculated from data on BTUs by fuel type for the U. S. and for each state in 2006 from the U.S. Energy Information Administration website and information on the CO₂ emissions per million BTUs for various fuel types (http://en.wikipedia.org/wiki/Greenhouse_gas).