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CO_2-Emission Cuts: The Economic Costs of the EPA's ANPR Regulations

David W. Kreutzer, Ph.D., and Karen A. Campbell, Ph.D.

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David W. Kreutzer, Ph.D., and Karen A. Campbell, Ph.D.

The Environmental Protection Agency's (EPA) Advance Notice of Proposed Rulemaking (ANPR) foreshadows new regulations of unprecedented scope, magnitude, and detail. This notice is not just bureaucratic rumination, but could very well become the law of the land. Jason Grumet, a senior environmental advisor to Barack Obama, has promised that a President Obama would "initiate those rulings." These rulings offer the possibility of regulating everything from lawn-mower efficiency to the cruising speed of supertankers. Regardless of the chosen regulatory mechanisms, the overall economic impact of enforced cuts in carbon dioxide (CO_2) emissions as outlined in the ANPR will be equivalent to an energy tax.

By expanding the scope of the 1990 amendment to the Clean Air Act (CAA), the EPA will severely restrict CO_2 emissions, thereby severely restricting energy use.[1] Specifically, the EPA would use the CAA to regulate emissions of greenhouse gases (GHG) from a vast array of sources, including motor vehicles, boats and ships, aircraft, and rebuilt heavy-duty highway engines.[2] The regulations will lead to significant increases in energy costs. Furthermore, because the economic effect of the proposed regulations will resemble the economic effect of an energy tax, the increase in costs creates a correspondingly large loss of national income.

Using the CAA to regulate greenhouse gases will be very costly, even given the most generous assumptions. To make the best case for GHG regulation, we assume that all of the problems of meeting currently enacted federal, state, and local legislation have been overcome.[3] Even assuming these unlikely goals are met, restricting CO_2 emissions by 70 percent will damage the U.S. economy severely:

- Cumulative gross domestic product (GDP) losses are nearly $7 trillion by 2029 (in inflation-adjusted 2008 dollars), according to The Heritage Foundation/Global Insight model (described in Appendix A).

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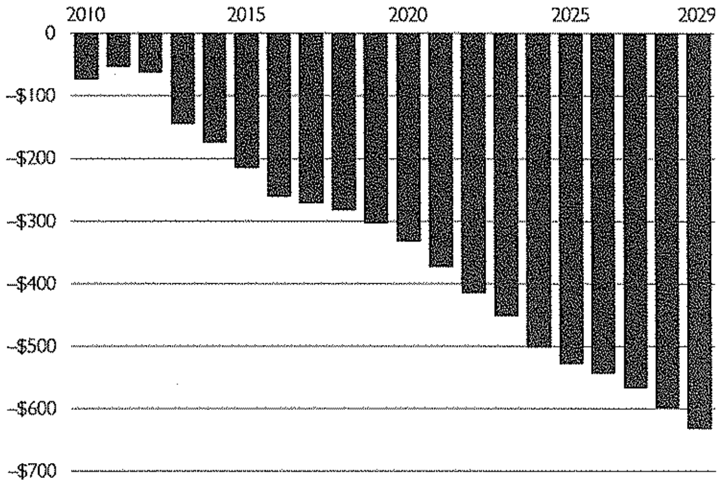
1. The EPA has the authority to regulate all greenhouse gases. The primary GHGs to be regulated are CO_2, methane, and nitrous oxide. This paper limits its analysis to the economic impact from the higher energy costs that regulating CO_2 would generate.
2. In *Massachusetts v. the Environmental Protection Agency*, 549 U.S. 497 (2007), a divided Supreme Court determined that carbon dioxide is a pollutant as defined in the Clean Air Act. This decision gives the EPA the authority, but not necessarily the mandate, to regulate CO_2 to prevent global warming or other harmful effects attributed to CO_2. Though the EPA has not, as of this writing, made the endangerment finding that would precipitate regulation, the detailed proposals of the Advanced Notice of Proposed Rulemaking can be interpreted to indicate just such an intent. An endangerment finding is very likely to precipitate a cascade of regulatory actions even though the EPA may prefer a more limited response. This study makes the generous assumption that the EPA can limit the scope and speed with which the regulations are implemented.
3. Examples of the costly existing regulations are the enacted, but not yet in effect, higher Corporate Average Fuel Economy (CAFE) standards, renewable portfolio standards for electricity generation, and stricter building codes.

- Single-year GDP losses exceed $600 billion (in inflation-adjusted 2008 dollars).
- Annual job losses exceed 800,000 for several years.
- Some industries will see job losses that exceed 50 percent.

Lost Gross Domestic Product Due to Clean Air Act Regulation of CO_2

By restricting CO_2, the Clean Air Act will create higher energy costs and decrease the U.S. economy by an average of $339 billion every year through 2029.

Annual Change in Gross Domestic Product, in Billions of Dollars



Source: Center for Data Analysis, Heritage Foundation calculations from the Global Insight macroeconomic model.

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Due to limitations in macroeconomic models, this analysis by The Heritage Foundation's Center for Data Analysis (CDA) does not extend beyond 2029. Further, the ANPR alludes to regulations in general, but is not as specific as proposed legislation. Nevertheless, the ANPR's implicit CO_2 targets resemble previous attempts to legislate GHG emissions, such as the 2008 Lieberman–Warner Climate Security Act (S. 2191), which mandated a 70 percent reduction below the 2005 level by 2050.

The new ANPR regulations will force consumers to pay more for energy as well as for other goods. Furthermore, the increased regulations and subsequent high energy prices throw a monkey wrench into the production side of the economy. Contrary to claims of an economic boost from "green investment" and "green collar" job creation, more EPA regulation *reduces* economic growth, GDP, and employment opportunities.

While there are some initial years in the period of our analysis during which CAA regulation of GHG could spur additional investment, this investment was completely undermined by the higher energy prices. Investment contributes to the economy when it increases future productivity and income. The greater and more effective the investment, the greater the increase in future income. Since income (as measured by GDP) drops as a result of new regulation, it is clear that more capital is destroyed than created. The cumulative GDP losses for 2010 to 2029 approach $7 trillion with single-year losses of nearly $650 billion.

The anticipated "green-collar" jobs meet a similar fate. It may well be that some businesses will experience an increase in employment. But, overall, companies are saddled with significantly higher energy costs, as well as increased administrative costs, that will be reflected in their product prices. The higher prices make their products less attractive to consumers and thus less competitive. As a result, total employment drops along with the drop in sales.

With increased regulation through the CAA, there is a small initial increase in employment as businesses build and purchase the newer, more CO_2-friendly plants and equipment. However, any "green-collar" jobs created are more than offset by the hundreds of thousands of lost jobs in later years. Chart 2 illustrates the projections of overall employment losses from these restrictions on CO_2 emissions.

ANPR—WHAT IT REALLY MEANS

In response to the Supreme Court's decision in *Massachusetts v. EPA*, the EPA has proposed an unprecedented expansion of federal GHG regulation through the CAA. While the precise details of the regulations remain undefined, the ANPR is sure to generate many of the same economic responses as the Lieberman–Warner Climate Security Act.

As the EPA does not appear to have the statutory authority necessary to implement market-based approaches to GHG reduction, such as a carbon tax, in which case firms and consumers could economize on taxed goods and promote alternatives or technology-neutral subsidies, the ANPR relies on a set of rules and restrictions while ultimately failing to achieve a meaningful reduction in atmospheric concentrations of GHGs. The end result of these complex regulations will be a dramatic increase in energy costs with little environmental gain.

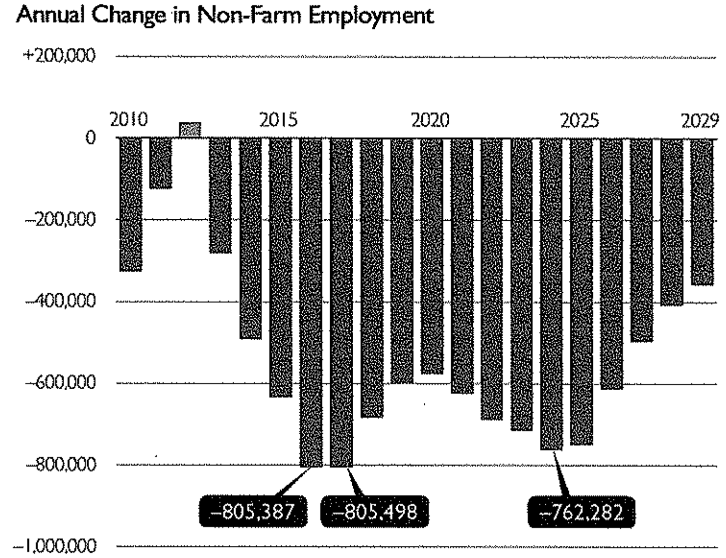
In addition to increasing the costs of energy use, regulating GHGs through the Clean Air Act will expand the EPA's authority to unprecedented levels. The ANPR will likely:

- Trigger the Prevention of Significant Deterioration (PSD) program, which could require permits for large office and residential buildings, hotels, retail stores, and other similarly sized projects;
- Regulate the design of manufacturing plants;
- Regulate the design of airplanes;
- Lower speed limits below current levels;
- Impose speed restrictions on ocean-going freighters and tankers;
- Export economic activity to less-regulated countries, thereby compromising the U.S.'s ability to compete in the global economy; and
- Transform the EPA into a *de facto* zoning authority, granting the agency control over thousands of previously local or private decisions, affecting the construction of schools, hospitals, and commercial and residential development.

These regulations are just a small sample of the areas into which the ANPR would expand the EPA's authority.

Clean Air Act Regulations Will Cost Millions of Jobs

The U.S. will lose 10.7 million jobs cumulatively through 2029.



Source: Center for Data Analysis, Heritage Foundation calculations from the Global Insight macroeconomic model.

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Limits of Analysis

Regulating CO_2 emissions under the Clean Air Act will burden the economy with higher energy costs, higher administrative compliance costs for businesses, higher bureaucratic costs for enforcing the regulations, and higher legal costs from the inevitable litigation. This study examines only the economic impact from the higher energy costs. Further, CDA analysts assume that the EPA can enforce CO_2 restrictions with perfect efficiency. In no case does the EPA cut a pound of CO_2 in one area if it could be done more cheaply in another. Including the other compliance costs and accounting for the likely inefficiency in imposing regulation, the costs of regulating CO_2 emissions under the Clean Air Act may be significantly higher.

For an example of the extent to which administrative compliance costs may be burdensome, see Portia M. E. Mills and Mark P. Mills, "A Regulatory Burden: The Compliance Dimension of Regulating CO_2 as a Pollutant," The U.S. Chamber of Commerce, September 2008, *http://www.uschamber.com/assets/env/regulatory_burden0809.pdf* (October 23, 2008).

THE SIMULATIONS

This CDA report discusses the effect the ANPR will have on energy activity and the cost of using energy. Policymakers and others who follow the climate change debate should find this simulation helpful in understanding the economic consequences of such unprecedented regulatory expansion. This report makes no attempt, however, to calculate the significant administrative and legal costs of complying with the new rules.

The report discusses two different policy alternatives affecting this country's economic future, each shaped by different policies designed to reduce atmospheric carbon dioxide and, presumably, to reduce the warming trend in global climate change:

- **The current-law baseline** is a highly detailed, 30-year economic forecast that incorporates the principal elements of energy and climate change policies signed into law last year.
- **The alternative** is a scenario in which the EPA promulgates a broad range of regulations to cut CO_2 emissions by 70 percent by 2050.

THE BASELINE

Key Assumptions. The baseline for the ANPR simulations builds on the Global Insight (GI) November 2007 long-term-trend forecast. The GI model assumes that:

> [T]he economy suffers no major mishaps between now and 2037. It grows smoothly, in the sense that actual output follows potential output relatively closely. This projection is best described as depicting the mean of all possible paths that the economy could follow in the absence of major disruptions. Such disruptions include large oil price shocks, untoward swings in macroeconomic policy, or excessively rapid increases in demand.[4]

The GI long-term model forecasts the trend of the U.S. economy. "Trend" means the most likely path that the economy will follow if, for instance, it is not disturbed by a recession, extremely high oil prices, or the collapse of major trading partners. One way to think about the long-term trend is to imagine a pathway through the cyclical patterns of our economy, as well as the effects of cyclical patterns in foreign economies on the U.S. economy.

Given the fiscal and economic challenges facing the United States (particularly the mounting federal deficits stemming from the long-expected crisis in Social Security, Medicare, and Medicaid outlays), the long term already has significant risks. The baseline assumes that the economy successfully avoids any sharp drops. At the same time, there is no inclusion of similarly large, potentially positive, shocks to the economy.

Energy prices, patterns of use, and supply change continuously in response to legislation and market conditions. To evaluate the economic impact of ANPR regulations, we must establish what the expected levels of emissions and available technology would be over the bill's proposed lifetime in the absence of its passage. Only with a determined baseline situation can the costs of meeting the goals and constraints of these regulations be estimated.

Two fundamental trends establish the baseline path of CO_2 emissions. First, aggregate income growth leads to greater demand for power across all sectors of the economy. Most of this power is generated by burning fossil fuels.

Partially offsetting the associated increase in CO_2 emissions is the second trend of increasing carbon efficiency in the energy sector. The improved efficiency comes from a variety of changes in both production and consumption, including power-generating technology that increases the yield of useable power for each ton of CO_2 emitted; continual improvements in the energy efficiency of appliances, new homes, and light vehicles; increased use of renewable fuels; and greater generation and use of nuclear power.

Government mandates—federal, state, and local—continue to enforce additional energy effi-

4. Global Insight, "Long-Term Forecast 30-Year Overview," October 2007. Heritage Foundation analysts relied on models maintained by Global Insight to develop the economic estimates reported in this paper. The Global Insight model is used by private-sector and government economists to estimate how changes in the economy and public policy are likely to affect major economic indicators. The methodologies, assumptions, conclusions, and opinions presented here are entirely the work of analysts at The Heritage Foundation's Center for Data Analysis. They have not been endorsed by, and do not necessarily reflect the views of, the owners of the Global Insight model.

ciency and limit CO_2 emissions, which helps to meet the ultimate target of the ANPR regulations. These mandates may work in parallel with the ANPR, and they create compliance costs, but since these compliance costs are already in force without the additional regulation under the CAA, they are not attributable to the ANPR.

Examples of the baseline costs necessary for meeting the ANPR goals that are attributable to other legislation include:

- Manufacturing cars and trucks that satisfy the much higher fuel-economy standards mandated for the next 20 years;
- Producing 36 billion gallons of biofuels including 16 billion gallons of cellulosic ethanol;
- Complying with expensive new building codes; and
- Producing ever more energy-efficient household appliances.

Aggregate Energy Use. Continued gains in energy efficiency will restrain the growth of energy demand below the rates of economic growth and below the rates experienced in the past half-century—approximately 1.5 percent per year. These efficiencies are driven by both markets and mandates. We project baseline primary energy demand to grow at 0.5 percent each year through 2029.

Petroleum. According to baseline assumptions, petroleum prices will settle around $70 a barrel in nominal terms and decline to $46 a barrel (in 2006 dollars) by 2030. Even in the absence of Corporate Average Fuel Economy (CAFE) limit changes, higher prices induce consumers to move to more efficient vehicles.

On the mandates side, the Energy Independence and Security Act of 2007 (EISA) raises the bar for vehicle fuel efficiency. The CAFE standard rises to 35 miles per gallon by 2020 for all light vehicles. For subsequent years, the EISA mandate reads:

> For model years 2021 through 2029, the average fuel economy required to be attained by each fleet of passenger and non-passenger automobiles manufactured for sale in the United States shall be the maximum feasible average fuel economy standard for each fleet for that model year.

The expected CAFE standards are 47.5 miles per gallon for new passenger cars and 32 miles per gallon for new trucks by 2029, and the average for all light vehicles, whether new or old, will be 33 miles per gallon.

Overall, petroleum consumption will grow by 0.6 percent per year between 2005 and 2029.

Natural Gas. In the baseline scenario, gas prices settle just below $7 per million British thermal units. This is less than the current price but well above 1990s levels. Alaskan pipeline deliveries will not begin until 2025, at which point they will help to offset supply reductions in the Lower 48 as well as imports from Canada.

Nearly 100 gigawatts of old natural-gas-steam are retired, and 50 gigawatts of the more efficient "natural gas combined cycle" (NGCC) plants are built. Total natural gas consumption grows by 0.4 percent per year through 2029.

Coal. In the baseline case, coal use is restrained by slower growth of energy demand and increasing generation of nuclear and renewable power. Demand will grow by an average of 0.2 percent each year through 2029.

One hundred gigawatts of old inefficient power-generating capacity are retired. Sixty-five gigawatts of new and replacement coal-fired power-generation plants will be added using the "integrated gas combined cycle" (IGCC) or advanced pulverized-coal technologies. These more efficient technologies use less coal and emit less CO_2 per unit of electricity generated and are ready to be fitted for carbon capture and sequestration (CSS). Because of the additional cost, there is no use of CCS technology in the baseline case.

Better and more widely adapted scrubbing technology allows broader use of high-sulfur coal. This will open up more sourcing options and lower the average cost of coal.

In real dollars, coal prices will settle near the levels observed in the 1990s.

Nuclear Energy. Though there are no significant CO_2 emissions from nuclear power generation, it is not considered "renewable" for the purpose of meeting existing state-imposed targets. Nevertheless, federal incentives are already in place for building 12 gigawatts of new capacity and 3 gigawatts of uprated added capacity at existing plants.

Resolving the problems with waste disposal is a major hurdle in expanding nuclear power generation. The baseline assumption is that nuclear power plants will continue to store the waste on site. Given the already high use of available capacity, electricity generated by nuclear power is projected to grow by only 0.5 percent per year through 2029.

Renewable Energy Sources. Federal and state initiatives already in place seek to increase the use of renewable energy sources. The definition of "renewable" varies from state to state but generally includes biomass, wind, and solar power.

Higher fuel prices along with state and federal mandates cause renewable fuel use to grow at 5.5 percent per year through 2029. We assume that producers will be able to meet the ethanol (corn-based and cellulose-based) targets set by the EISA, though experience thus far suggests otherwise.

THE ALTERNATIVE

Key Assumptions. The ANPR contains no explicit overall targets for emissions reductions on an annual basis; most likely the reductions will be phased in. Using previous emission levels as yardsticks, we assume that the 2012 emissions will match the 2005 emission level and drop by roughly 2 percent per year. The allowed emissions drop to 15 percent below the 2005 emissions level by 2020, and to 31 percent below the 2005 levels by 2029. Though we do not model the impact of regulations beyond 2029, the typical target would be a 70 percent reduction by 2050.

There are other gases that have much higher greenhouse effects per ton of emissions than CO_2. However, these gases are emitted in much smaller volumes by human activity. CO_2 is responsible for about 85 percent of the man-made GHG warming; therefore, this study examines only the economic impact of constraints on CO_2 emissions.

Coal Technology. Due to its abundance, coal is the least expensive source of energy, and it fuels about half of America's electricity supply. CCS is a promising, but not yet commercialized, technology for dramatically reducing CO_2 emissions from coal-powered electricity.

Of course, CCS technology has additional costs, which are higher when retrofitting existing plants than when building the technology into new plants. Though there are pilot projects in operation, full-scale commercialization would require sequestering more than 40 million barrels of CO_2 each day. Environmental concerns and the logistical hurdles of handling such large quantities are likely to delay full implementation of CCS until after 2029, so we assume no CCS during the 2010–2029 period examined here.

Nuclear Energy. The projection is for no additional nuclear power beyond the additional 15 gigawatts in the base case.

Renewable Energy Sources. Current state and federal legislation calls for more than tripling the amount of renewable energy in power generation and increasing the amount of biofuels used in transportation by more than 1,000 percent. This includes 16 billion gallons per year of corn-based ethanol and biodiesel and 20 billion gallons per year of cellulosic ethanol and biodiesel. Again, our assumption is that cellulosic biofuels become commercially feasible in time to meet the mandates that are already planned. Progress on cellulosic ethanol has been frustratingly slow to this point.

While the ANPR may have no additional mandates for biofuels, restricting CO_2 emissions from fossil fuel use will lead to greater use of biofuels. At this time, there is no commercially feasible cellulosic ethanol production. If this technology fails to deliver as projected, energy prices will be forced to increase enough to reduce the quantity of energy demanded by the amount of missing cellulosic ethanol.

Green Jobs

Higher energy prices lead consumers and producers to economize their energy use. This will come from a combination of simply producing and using less of the energy-consuming products and activities. The economizing can also come from investing in more energy-efficient products and processes. This latter response is often credited with creating "green" or "green-collar" jobs. These responses have been estimated in the equations of the macroeconomic model used for our analysis. Therefore, the job losses reported in this study are over and above any "green" job gains. The net impact of the regulations will be lower employment and less income. The "green jobs dividend" is negative.

ECONOMIC COSTS OF THE ANPR

The ANPR affects the economy directly by increasing the cost of using carbon-based energy. These higher costs require consumers and producers to switch to inferior or more expensive substitutes or to simply cut production and consumption.[5]

The economic model employed here treats the proposed regulations like a tax on energy producers. Thus, energy prices increase by the amount dictated by the regulations. The demand for energy responds to higher energy prices both directly and indirectly. The direct effect is a reduction in the consumption of carbon-based energy and a shift, where possible, to substitutes that either do not require the fee or require a smaller one.

The indirect effects are more complex. Generally speaking, the ANPR regulations reduce the amount of energy used in producing goods and services, which restricts the demand for labor and capital and reduces the rate of return on productive capital. This "supply-side" impact exerts the predictable secondary effects on labor and capital income, which depresses consumption.

These are not unexpected effects. Carbon-reduction schemes that depend on excessive regulations, fees, or taxes attain their goals of lower atmospheric carbon by slowing carbon-based economic activity. Of course, advocates of this approach hope that other energy sources will arise that can be used as perfect substitutes for the reduced carbon-based energy.

Our simulation of potential CAA regulations attempts to follow the vision of the authors' proposal. The process is assumed to be unhampered by lawsuits, bureaucratic inefficiencies, or technological bottlenecks. Everything is "by the book."

If we have succeeded in these efforts, then policymakers can expect the following similar economic effects:

Economic Output Declines. The broadest measure of economic activity is the change in GDP after accounting for inflation. GDP measures the dollar value of all goods and services produced for final sale to consumers in the United States during the year. Anticipation of CO_2 restrictions causes an initial increase in gross private investment as firms accelerate capital projects to avoid the higher costs of a CO_2-constrained economy. In addition, there may be some initial-investment increases from businesses replacing their soon-to-be obsolete energy-intensive capital.

Nevertheless, the net impact on a CO_2-constrained economy is negative, since GDP is never higher than in the baseline scenario. Higher energy costs decrease the use of carbon-based energy in the production of goods, incomes fall, and demand for goods subsides. GDP declines in 2020 by $332 billion, in 2025 by $528 billion, and in 2029 by $632 billion. The aggregate income loss for the 20-year period is $6.8 trillion. All figures have been adjusted for inflation to reflect 2008 prices.

This slowdown in GDP is seen more dramatically in the slump in manufacturing output. Again, the manufacturing industry benefits from the initial investment in new energy production and energy-efficient capital, but the manufacturing sector's declines are sharp thereafter.

Indeed, by 2029, manufacturing output in this energy-sensitive sector will be 27 percent below what it would be if the ANPR proposals are never applied. In 2029, the manufacturing output is $1.48 trillion less than the baseline output; that is, when compared to the economic world without the CAA regulation of CO_2. This is equivalent to losing more than 80,000 manufacturing firms. Aggregate manufacturing loss from 2010 to 2029 is $10.9 trillion.

Number of Jobs Declines. The loss of economic output is the proverbial tip of the economic iceberg. Below the surface are economic reactions to the legislation that led up to the drop in output. Employment growth slows sharply following the boomlet of the first few years. Potential employment (or the job growth that would be implied by the demand for goods and services and the relevant cost of capital used in production) slumps sharply. In 2015, regulation-induced employment losses exceed 500,000; and they exceed that level for the remainder of the investigated period. Non-farm job losses peak at more than 800,000.

Indeed, in no year after the boomlet does employment under the ANPR outperform the base-

5. These adjustments will take place on many dimensions. For instance, consumers may be forced to consume more expensive and less reliable solar and wind energy; consumers may drive smaller, less safe cars; and increased building costs can lead to smaller and more expensive homes.

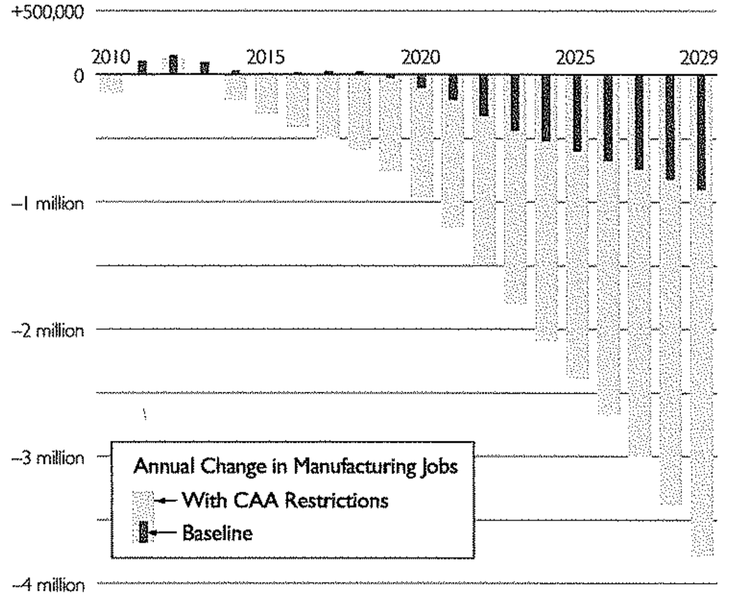
line economy where these proposed regulations never become law.

For manufacturing workers, the news is grim indeed. Employment will already be in decline due to increased labor-saving productivity: Our baseline shows that even without additional job-killing regulations, manufacturing employment will drop by more than 980,000 jobs. The ANPR accelerates this decrease substantially: Employment in manufacturing declines by an additional 22.6 percent or 2,880,000 jobs beyond the baseline losses. By 2029, several specific areas of the manufacturing industry will experience particularly harsh employment losses:

- Durable-manufacturing employment will decrease by 28 percent;
- Machinery-manufacturing job losses will exceed 57 percent;
- Textile-mills employment will decrease by 27.6 percent;
- Electrical-equipment and -appliance employment will decrease by 22 percent;
- Paper and paper-product jobs will decrease by 36 percent; and
- Plastic and rubber products employment drops 54 percent.

Manufacturing Jobs Will Take Significant Hit

Primarily due to increasing productivity, manufacturing can expect to see employment losses approaching 1 million jobs even without restrictions on CO_2 emissions. This is the baseline case. Higher energy costs from CO_2 restrictions under the Clean Air Act will lead to nearly 3 million more lost jobs in addition to the baseline losses.



Source: Center for Data Analysis, Heritage Foundation calculations from the Global Insight macroeconomic model.

Chart 3 • CDA 08-10 heritage.org

All employment declines described are in addition to those that occur in the baseline projections.

Other, less energy-intensive sectors, however, do not suffer such decreases. For instance, government employment ends the 20-year period 0.62 percent ahead of the baseline level; professional and business service employment (which includes lawyers) rises by 6.14 percent; and employment in education rises by 8.4 percent more than the baseline.

Because states have different mixes of industries, the job losses are not evenly distributed. The states whose economies are disproportionately dependent on manufacturing, such as Indiana, Louisiana, Wisconsin, Iowa, and Oregon, will be disproportionately affected by the manufacturing job losses.

Incomes and Consumption Decline. Declining demand for energy-intensive products reduces employment and incomes in the businesses producing these products. Workers and investors earn less, and household incomes decline. Reductions in income in these sectors spread and cause declines in demand for other sectors of the economy.

Our simulation captures this effect of higher energy costs: Disposable personal income falls $145 billion below baseline in 2015 and averages $2.6 trillion below baseline over the entire period of 2010 to 2029.

CONCLUSION

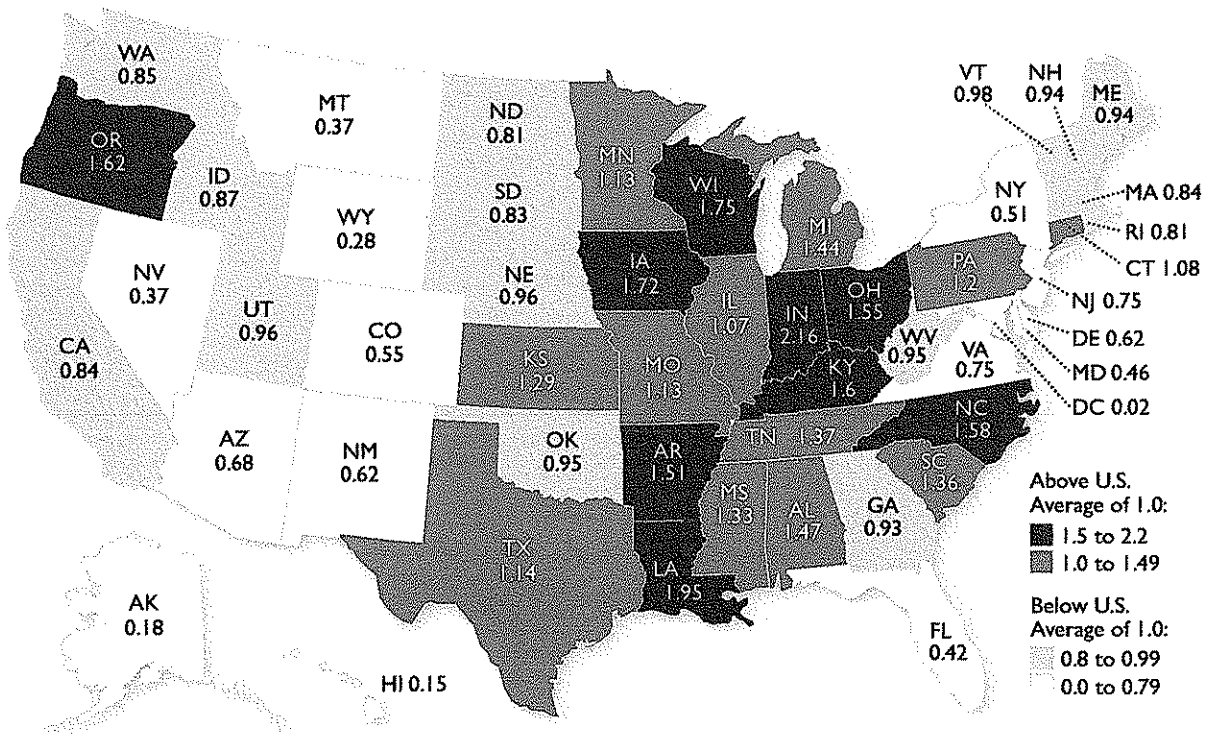
The ANPR proposes an unprecedented expansion of federal ability to regulate CO_2 emissions. Its limits on CO_2 emissions would impose significant costs on virtually the entire American economy.

Even under a fairly optimistic set of assumptions, the economic impact of the ANPR is likely to be serious for the job market, household budgets, and the economy overall. The effects discussed above in the simulation are the result of restricted energy use only; they do not consider the substantial administrative costs of complying with the new regulations.

The burden will be shouldered by the average American. The regulations would have the same impact on GDP and employment as would a major new energy tax—only worse. In the case of the

State-by-State Manufacturing Intensity

This map shows the relative importance of manufacturing in each state compared to the U.S. average. Proposed restrictions on CO_2 will cut overall manufacturing jobs by 23 percent and cause some manufacturing industries to lose more than 50 percent of their jobs. States with manufacturing intensity greater than 1.0 can expect more severe job losses in manufacturing.



U.S. Rankings, from Highest to Lowest

	State			State			State	
1	Indiana	2.16	18	Minnesota	1.13	35	North Dakota	0.81
2	Louisiana	1.95	19	Missouri	1.13	36	Rhode Island	0.81
3	Wisconsin	1.75	20	Connecticut	1.08	37	New Jersey	0.75
4	Iowa	1.72	21	Illinois	1.07	38	Virginia	0.75
5	Oregon	1.62	22	Vermont	0.98	39	Arizona	0.68
6	Kentucky	1.60	23	Nebraska	0.96	40	Delaware	0.62
7	North Carolina	1.58	24	Utah	0.96	41	New Mexico	0.62
8	Ohio	1.55	25	Oklahoma	0.95	42	Colorado	0.55
9	Arkansas	1.51	26	West Virginia	0.95	43	New York	0.51
10	Alabama	1.47	27	Maine	0.94	44	Maryland	0.46
11	Michigan	1.44	28	New Hampshire	0.94	45	Florida	0.42
12	Tennessee	1.37	29	Georgia	0.93	46	Montana	0.37
13	South Carolina	1.36	30	Idaho	0.87	47	Nevada	0.37
14	Mississippi	1.33	31	Washington	0.85	48	Wyoming	0.28
15	Kansas	1.29	32	California	0.84	49	Alaska	0.18
16	Pennsylvania	1.20	33	Massachusetts	0.84	50	Hawaii	0.15
17	Texas	1.14	34	South Dakota	0.83	51	D.C.	0.02

Source: Heritage Foundation calculations based on data from Bureau of Economic Analysis, Gross Domestic Product by State, 2007, at *http://www.bea.gov/regional/gsp.*

Map 1 • CDA 08-10 heritage.org

CAA, increases in costs are set by forces beyond legislative control.

Overall, using the CAA to regulate CO_2 would likely be the most expensive and expansive environmental undertaking in history.

—David W. Kreutzer, Ph.D., is Senior Policy Analyst for Energy Economics and Climate Change, and Karen A. Campbell, Ph.D., is Policy Analyst in Macroeconomics, in the Center for Data Analysis at The Heritage Foundation.

APPENDIX A
METHODOLOGY

Analysts at The Heritage Foundation and the Global Insight forecasting company employed a wide array of analytical models to produce the micro- and macroeconomic results reported in this paper. This section describes the models and the major steps performed by these analysts to shape the modeling results.

U.S. Energy Model (Long-Term)

Global Insight's U.S. Energy Model has been designed to analyze the factors that determine the outlook for U.S. energy markets. A staff of more than 15 energy professionals supports the model and forecasting effort. The model is constructed as a system of several models that can be used to assess intra-market issues independently of each other. The integrated system is used to produce Global Insight's baseline Energy Outlook and allows users to simulate changes in domestic energy markets.

The U.S. Energy Model is an integrated system of fuel and electric power models and the End-User Demand Model. The solution is achieved through an iterative procedure. Also, monthly models of petroleum and natural gas prices use the framework of the long-term forecast with additional weekly and monthly information to analyze seasonal fuel prices and update the price forecasts on a monthly basis. The major models that comprise the Energy Model and their interrelationships are described below.

End-Use Demand Model. Demand for final-use energy is modeled by sector, fuel, and census region based on the competitive position of each fuel in its end-market. The total demand for energy is estimated as a function of the stock of energy equipment, technology change, prices of competing final energy sources, and economic performance. The initial demand profile by region of the U.S. for each fuel is then integrated with the U.S. Petroleum, Natural Gas, Coal, and Electric Power Models, each of which consists of three major sub-modules—a supply and transformation module, a transportation/transmission/distribution module, and a wholesale/retail price module.

U.S. Petroleum Model. The U.S. Petroleum Model uses the world oil price projection from Global Insight's Global Oil Outlook. The model then determines refined petroleum product prices to end-users by adding refining markups, inventory, and transportation costs. For selected products, federal, state, and local taxes are also accounted for in the model.

The U.S. Petroleum Model also provides a baseline projection of U.S. crude and natural gas production that is based on an annual review of data and literature on U.S. reserves, production, and technological progress.

A simulation block for investigating the supply response under alternative assumptions is part of this model. Imported supplies of crude and petroleum products are developed by the difference between domestic production and the sum of the direct consumption of petroleum by consumers and the transformation demand for petroleum by the power sector.

Natural Gas Model. The Natural Gas Model consists of three major sub-modules: a supply module, a transmission/distribution module, and a spot-pricing module.

- The *supply module* projects production based on analysis of U.S. reserve data, exploratory and development drilling, and technological progress. A simulation block for investigating supply responses under alternative assumptions is part of this module.
- The *transmission/distribution module* projects cost by customer class.
- The *spot-pricing model* integrates the results of the End-User Demand Model, the natural gas demand by the power sector from the Electric Power Model, and the embedded supply and transmission/distribution modules to determine producer prices by basin. A conclusive solution is developed through an interactive process.

Coal Model. The Coal Model is a simulation model designed to replicate the market response of this sector under alternative scenarios. Finalized through the interactive process, the baseline market analysis is provided by JD Energy (a coal and power consulting firm) that includes analysis and forecasts of coal production, rail costs, coal flows, and coal prices.

Electric Power Model. The U.S. Electric Power Model is a detailed, regional (census region) model of the power-generation sector combined with a more aggregate module of the regional transmission and distribution sector.

The preliminary demand for regional generation is determined as a function of the demand for electricity determined in the End-User Demand Model, transmission losses, and trade. Generation requirements are met through the capacity module, which projects capacity decisions based on fuel prices, operating and maintenance costs, and technological progress. Usage is projected as a function of the amount of electricity generated and marginal production cost. Through this analysis, a preliminary demand for a specific fuel by the power sector is developed that is finalized in the iterative process.

Energy Balances Model. The Energy Balances Model completes the process. This model provides national and regional summations of energy use across all fuel types and customer classes.

Operation of the Energy Models. The ANPR implies very aggressive carbon-reduction targets between 2012 and 2050. Most proposed legislation allows offsets to achieve the target CO_2 reductions. We assume that EPA regulation of CO_2 emissions would target actual reductions equivalent to those required beyond the allowed offsets in legislation, such as the Lieberman–Warner bill. That is, we assume that the regulatory regime allows 30 percent of the reductions to come from non-domestic-energy reductions.

Global Insight Long-Term U.S. Macroeconomic Model

The Global Insight (GI) long-term U.S. macroeconomic model is a large-scale 30-year (120-quarter) macroeconometric model of the U.S. economy. It is used primarily for commercial forecasting.

Over the years, analysts at The Heritage Foundation's Center for Data Analysis have worked with economists at Global Insight to adapt the GI model to policy analysis. In simulations, CDA analysts use the GI model to evaluate the effects of policy changes not only on disposable income and consumption in the short run, but also on the economy's long-run potential. They can do so because the GI model imposes the long-run structure of a neoclassical growth model, but makes short-run fluctuations in aggregate demand a focus of analysis.

The Global Insight model can be used to forecast more than 1,400 macroeconomic aggregates. Those aggregates describe final demand, aggregate supply, incomes, industry production, interest rates, and financial flows in the U.S. economy. The GI model includes such a wealth of information about the effects of important changes in the economic and policy environment because it encompasses detailed modeling of consumer spending, residential and non-residential investment, government spending, personal and corporate incomes, federal (and state and local) tax revenues, trade flows, financial markets, inflation, and potential gross domestic product.

Consistent with the rational-expectations hypothesis, economic decision making in the GI model is generally forward-looking. In some cases, Global Insight assumes that expectations are largely a function of past experience and recent changes in the economy. Such a retroactive approach is used in the model because GI believes that expectations change little in advance of actual changes in the economic and policy variables about which economic decision makers form expectations.

Operation of the U.S. Macroeconomic Model

The policy changes implied by the ANPR and implemented in the U.S. Energy Model (as described above) resulted in more than 71 changes in the U.S. Macroeconomic Model. These changes ranged from energy-source variables (such as the price of West Texas Intermediate crude oil, an industry benchmark price series) to the carbon tax rate per ton of coal.[6] These energy-model results were introduced into the macro model in the following ways:

Energy Price Effects. Heritage Foundation analysts used the market price changes in the refiner's acquisition price for oil (West Texas Intermediate) and natural gas prices at the wellhead (Henry Hub) directly from the energy model.

The macro model contains a host of producer prices that are changed through their interaction with other variables in this model. However, the modeled policy changes affect producer prices in the energy sectors directly. Thus, the energy model's settings for these producer prices were used instead of those in the macro model. Technically, energy-producer prices were exogenous and driven by corresponding prices from the energy model. The following producer price categories were affected:

6. The specific year-by-year settings are available upon request from the Center for Data Analysis at The Heritage Foundation.

coal, natural gas, electricity, natural gas, petroleum products, and residual fuel oil.

We employed a similar procedure in implementing changes in consumer prices. In this case, the variables affected were all consumption-price deflators. Once again, we substituted energy-model settings for these variables for their macro-model counterparts. The following consumption price deflators were affected: fuel oil and coal, gasoline, electricity, and natural gas.

Energy Consumption Effects. Both the energy model and the macro model contain equations that predict changes in demand for energy, given changes in energy prices, but the energy model contains a more detailed treatment of demand. Preferring details over generality, we lined up the demand equations in both models and substituted settings from the energy model for those in the macro model. Specifically, we lined up these demand equations:

- Total energy consumption;
- Total end-use consumption for petroleum;
- Total end-use consumption for natural gas;
- Total end-use consumption for coal; and
- Total end-use consumption for electricity.

One key transformation that took place dealt with the differing demand units used between the two models in calculating residential consumption. The energy model expresses demand in trillions of British thermal units, while the macro model projects demand in billions of constant dollars.

Another key transformation focused on consumer spending on gasoline. The energy model does not contain a separate forecast for spending on gasoline or other motor fuels. To overcome this, we projected the change in consumer spending on gasoline based on the energy model's change in total highway fuel consumption.

Capital Spending. The energy model calculates capital spending by electric utilities in the base case and in the ANPR case. Spending is higher (at least initially) and costlier in the ANPR case because higher-cost power plants are built or because old plants are refurbished. The change in spending was applied to the macro model variable for inflation-adjusted spending on utility investment after conversion to the appropriate base year.

The analysts then calculated the amount of spending that would have been required to produce the same level of electricity capacity had the mix of spending been equivalent to the baseline. The purpose here is to measure the extra resources required for utility construction simply due to the introduction of the resources related to the carbon fee that will produce lower emissions, but which will not produce extra GDP.

APPENDIX B

Key Economic Indicators as a Result of EPA Regulations of CO_2 for Fiscal Years

	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	Average, 2010–2028
Gross Domestic Product, In Billions of Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	12,327.04	13,020.85	13,543.31	14,145.07	14,842.12	15,568.37	16,282.08	17,026.17	17,867.52	18,713.05	15,333.6
Baseline	12,387.67	13,071.89	13,686.38	14,359.66	15,074.29	15,841.21	16,622.62	17,437.99	18,313.72	19,204.34	15,600.0
Difference	–60.6	–51.0	–143.1	–214.6	–232.2	–272.8	–340.5	–411.8	–446.2	–491.3	–266.4
Real GDP Growth Rate, Percent Change from Previous Year											
Forecast	2.90	2.60	2.18	2.22	2.48	2.40	2.28	2.22	2.47	2.31	2.4
Baseline	2.95	2.65	2.34	2.46	2.51	2.52	2.45	2.42	2.48	2.39	2.5
Difference	0.0	–0.1	–0.2	–0.2	0.0	–0.1	–0.2	–0.2	0.0	–0.1	–0.1
Total Employment, In Thousands of Jobs											
Forecast	141,932.68	145,601.18	147,072.92	148,591.39	150,540.45	152,800.81	155,151.66	157,823.49	160,734.86	163,831.18	152,408.1
Baseline	142,258.70	145,562.10	147,565.05	149,396.78	151,223.65	153,376.22	155,839.57	158,585.77	161,348.52	164,238.18	152,939.5
Difference	–326	39	–492	–805	–683	–575	–688	–762	–614	–407	–531
Private Employment, In Thousands of Jobs											
Forecast	119,188.93	122,606.73	123,787.31	125,044.92	126,751.96	128,758.43	131,076.34	133,600.57	136,347.74	139,249.94	128,641.3
Baseline	119,516.38	122,595.88	124,327.90	125,908.13	127,508.50	129,418.00	131,848.75	134,460.61	137,077.08	139,807.43	129,246.9
Difference	–327	11	–541	–863	–757	–660	–772	–860	–729	–557	–606
Unemployment Rate, Percent of Civilian Labor Force											
Forecast	4.93	4.55	5.00	5.14	5.00	4.91	4.91	4.90	4.83	4.73	4.9
Baseline	4.83	4.56	4.73	4.73	4.70	4.68	4.68	4.69	4.70	4.71	4.7
Difference	0.1	0.0	0.3	0.4	0.3	0.2	0.2	0.2	0.1	0.0	0.2
Disposable Personal Income, In Billions of Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	9,448.51	10,050.03	10,560.09	11,137.08	11,789.38	12,482.04	13,162.35	13,851.65	14,589.41	15,367.94	12,243.8
Baseline	9,483.88	10,098.90	10,666.04	11,261.03	11,898.38	12,583.67	13,279.52	13,990.82	14,729.04	15,486.70	12,347.8
Difference	–35.4	–48.9	–106.0	–124.0	–109.0	–101.6	–117.2	–139.2	–139.6	–118.8	–104.0
Disposable Income Per Capita, In Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	30,460.69	31,851.29	32,906.25	34,130.44	35,543.04	37,031.60	38,434.51	39,810.49	41,270.97	42,790.80	36,423.0
Baseline	30,574.72	32,006.18	33,236.41	34,510.30	35,871.64	37,333.10	38,776.67	40,210.49	41,665.95	43,121.48	36,730.7
Difference Per Person	–114	–155	–330	–380	–329	–301	–342	–400	–395	–331	–308
Difference for Family of Four	–456	–620	–1,321	–1,519	–1,314	–1,206	–1,369	–1,600	–1,580	–1,323	–1,317
Personal Consumption Expenditures, In Billions of Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	8,813.70	9,333.26	9,714.49	10,143.69	10,656.25	11,175.02	11,683.58	12,186.96	12,708.26	13,246.79	10,966.2
Baseline	8,855.51	9,391.97	9,860.68	10,333.68	10,841.44	11,364.97	11,900.16	12,436.46	12,975.95	13,524.53	11,148.5
Difference	–41.8	–58.7	–146.2	–190.0	–185.2	–190.0	–216.6	–249.5	–267.7	–277.7	–182.3
Personal Savings, In Billions of Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	247.00	297.81	398.54	518.08	629.28	775.91	924.85	1,089.44	1,284.69	1,503.07	766.9
Baseline	239.50	288.17	355.28	447.53	549.49	684.74	821.72	974.29	1,151.59	1,340.02	685.2
Difference	7.5	9.6	43.3	70.5	79.8	91.2	103.1	115.2	133.1	163.0	81.6

Sources: Center for Data Analysis, Heritage Foundation calculations from the Global Insight macroeconomic model.

Appendix Table 1a • CDA 08-10 heritage.org

Other Economic Indicators as a Result of EPA Regulations of CO_2 for Fiscal Years

	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	Average, 2010–2028
Personal Savings Rate, Percent of Disposable Personal Income											
Forecast	2.66	3.04	3.88	4.79	5.50	6.40	7.24	8.10	9.06	10.04	6.1
Baseline	2.57	2.91	3.40	4.06	4.71	5.55	6.31	7.10	7.96	8.79	5.3
Difference	0.1	0.1	0.5	0.7	0.8	0.9	0.9	1.0	1.1	1.3	0.7
Gross Private Domestic Investment, In Billions of Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	1,891.77	2,103.47	2,175.66	2,292.28	2,442.08	2,601.20	2,744.81	2,926.02	3,186.09	3,426.25	2,579.0
Baseline	1,914.68	2,112.13	2,215.26	2,353.34	2,473.63	2,625.02	2,785.06	2,971.56	3,209.48	3,441.12	2,610.1
Difference	–22.9	–8.7	–39.6	–61.1	–31.6	–23.8	–40.2	–45.5	–23.4	–14.9	–31.2
Non-Residential Investment, In Billions of Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	1,472.25	1,605.35	1,693.16	1,794.92	1,940.65	2,109.66	2,274.11	2,475.52	2,728.92	3,017.05	2,111.2
Baseline	1,483.99	1,601.22	1,710.29	1,837.88	1,970.58	2,131.21	2,310.62	2,515.17	2,753.92	3,027.62	2,134.2
Difference	–11.7	4.1	–17.1	–43.0	–29.9	–21.5	–36.5	–39.6	–25.0	–10.6	–23.1
Residential Investment, In Billions of Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	418.75	497.97	497.52	515.23	525.34	532.87	533.78	538.07	559.02	560.10	517.9
Baseline	425.75	500.35	505.75	519.13	520.08	525.12	525.76	529.15	547.86	547.40	514.6
Difference	–7.0	–2.4	–8.2	–3.9	5.3	7.8	8.0	8.9	11.2	12.7	3.2
Change in the Stock of Business Inventories, In Billions of Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	33.84	29.62	22.76	25.28	31.93	32.54	32.37	34.79	48.70	47.16	33.9
Baseline	38.04	39.24	36.38	42.64	43.62	47.08	50.51	56.81	64.93	68.43	48.8
Difference	–4.2	–9.6	–13.6	–17.4	–11.7	–14.5	–18.1	–22.0	–16.2	–21.3	–14.9
Full-Employment Capital Stock, In Billions of Inflation-Adjusted Dollars Indexed to the 2000 Price Level											
Forecast	14,606.22	15,427.15	16,221.96	17,026.94	17,900.64	18,881.73	19,948.73	21,120.07	22,426.08	23,914.18	18,747.4
Baseline	14,628.96	15,462.23	16,287.68	17,130.28	18,021.74	19,000.86	20,083.74	21,276.69	22,596.89	24,065.68	18,855.5
Difference	–22.7	–35.1	–65.7	–103.3	–121.1	–119.1	–135.0	–156.6	–170.8	–151.5	–108.1
Consumer Price Index, Percent Change from Previous Year											
Forecast	1.87	2.79	2.71	2.45	2.24	2.12	2.11	2.10	2.18	2.23	2.3
Baseline	1.92	1.81	1.86	1.97	1.95	1.88	1.83	1.87	1.90	1.92	1.9
Difference	0.0	1.0	0.8	0.5	0.3	0.2	0.3	0.2	0.3	0.3	0.4
Treasury Bill, 3 Month, Annualized Percent											
Forecast	4.8	5.3	5.3	5.3	5.1	5.1	5.0	5.0	5.0	5.1	5.1
Baseline	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Difference	0.2	0.7	0.7	0.7	0.5	0.5	0.4	0.4	0.4	0.5	0.5
Treasury Bond, 10 Year, Annualized Percent											
Forecast	5.4	5.8	5.9	5.9	5.7	5.7	5.7	5.7	5.7	5.8	5.7
Baseline	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Difference	0.2	0.5	0.7	0.6	0.4	0.4	0.4	0.4	0.4	0.5	0.5

Sources: Center for Data Analysis, Heritage Foundation calculations from the Global Insight macroeconomic model.

Appendix Table 1b • CDA 08-10 heritage.org

James Duran – CHCC

Sacramento Bee

Dan Walters: Going green could put California deeper in the red

Published Sunday, Nov. 16, 2008

Two years ago, as he was running for re-election to the governorship, Arnold Schwarzenegger did what he often did as a movie star – changed characters.

He transformed himself from a Hummer-driving tough guy who denounced legislators as "girlie men" into an Al Gore-like advocate for curbing global warming as he tried to persuade voters to give him more power.

A liberal Legislature seized the opportunity and enacted a climate change bill, Assembly Bill 32, which has earned the governor global publicity.

AB 32's goal is reducing California's greenhouse gas emissions to 1990 levels by 2020, long after Schwarzenegger's governorship ends. The heavy lifting was to be found in the regulations that a variety of state agencies, led by the Air Resources Board, would issue.

Two years later, it's becoming evident that meeting the goal will impose a very heavy monetary cost on a California economy that's now in freefall with no bottom in sight.

The ARB's "scoping plan," awaiting adoption, lays out sharp increases in electricity and natural gas service rates, much costlier gasoline and other financial burdens. And it's generating increasing resistance from business.

"The scoping plan will add to the worsening economic problems facing California companies and families," Shelly Sullivan, executive director of the business-backed AB 32 Implementation Group, said in a state Chamber of Commerce bulletin.

The coalition has published an 18-page critique of the ARB plan, saying it overvalues benefits and understates costs. Business advocates a "cap and trade" alternative to regulation that relies on market forces to reach goals.

The heavy cost of going green is also found in a new report by the California Public Utilities Commission charting the shift of electrical supp ly away from fossil fuel-fired plants and toward "renewable" sources such as windmills, geothermal and solar panels.

The state gets about 12 percent of its electricity from the latter now, and the avowed goal is 20 percent by 2010 – highly unlikely – and 33 percent by 2020. The state's voters this month rejected a ballot measure that would have increased it to 40 percent by 2020 and 50 percent by 2025.

Reaching even 33 percent by 2020, the PUC said, would require 70,000 gigawatt-hours of new renewable energy in 2020, tripling current production, and seven new major transmission lines to carry power. And, the PUC said, "such a target may require a state investment of about $60 billion in generation and transmission from 2010 to 2020."

Those costs would ultimately be borne by residential and commercial customers. And they could make the state even less competitive in a global economy – as even Schwarzenegger indirectly recognizes in seeking environmental exemptions for public works projects to jump-start the economy.

It's a big price for what could be nothing more than a symbolic act with infinitesimal effect on global warming.

James Duran, CHCC

The Heritage Foundation
November 5, 2008

Impact of CO2 Restrictions on Employment and Income: Green Jobs or Gone Jobs?

by David Kreutzer, Ph.D.
WebMemo #2122

The clear political failure of the Lieberman–Warner bill last spring shows that support for global–warming legislation wanes considerably when the extraordinary costs are compared to the almost insignificant benefits.[1] In response, those pushing restrictions on carbon dioxide (CO_2) have tried to repackage global–warming legislation as jobs bills.

As appealing as the repackaging seems on the surface (lots of high–paid, high–tech workers in lab coats), the support for these claims collapses once it is examined. A
little thought experiment helps give perspective.

Fuzzy Math

Suppose Jones used 1,000 kilowatt–hours (kW–h) when the price of electricity was $0.10 per kW–h. He spent $100 on electricity (1,000 kW–h x $0.10 = $100). Now suppose the price rises to $0.15 per kW–h. Responding to the higher price, Jones cuts his electricity consumption to 700 kW–h. How much better off is Jones with the higher price? Most would say, since he is now spending $105 for less electricity (700 kW–h x $0.15 = $105), he is worse off.

However, those promoting restrictions on CO_2 turn economics, logic, and math upside down. In their world, the answer is: Jones consumes 300 kW–h less and, at $0.15 per kW–h, he saves $45 (300 kW–h x $0.15 = $45). Then he spends this "extra" money and creates jobs.

Everybody else correctly thinks that since Jones now spends $105 for 30 percent less electricity, he is $5 poorer and has to get by with less energy. He has less to spend, not more. Thus there will be less employment, not more. This is especially true since one of the ways Jones cuts energy consumption is to use more expensive energy–conserving products, making his loss greater than $5.

Phantom Job Creation

The topsy–turvy, we–save–with–higher–prices way of thinking undergirds a recent well–publicized University of California study that claims restricting access to energy creates more income and more employment.[2] The study notes that per capita electricity use in California is 40 percent less than the national average and attributes this reduction to efficiencies brought on by state policies.

But Californians pay 36 percent more for their electricity, have watched manufacturing's share of state output drop by 15 percent since 1980, need less electricity for heating and cooling than the rest of the nation, live in smaller houses than the national average, and pay billions of dollars to generate electricity using inefficient alternatives.[3]

The 40 percent cut in per capita energy use is not free "efficiency," but it is treated as such. And it is projected to get 1 percent more "efficient" every year without cost.
The job creation in this study is as fallacious as the reasoning on which it is based.
But the silliness does not end there.

Another much–publicized study, done for the Center for American Progress, makes an even more fundamental error.[4] The authors of this study fall prey to the classic "broken windows" fallacy whereby spending money creates jobs as the expenditure multiplies throughout the economy. The fallacy comes from ignoring the equally large destruction of jobs (actually larger because of something called "deadweight loss") from taxing the $100 billion, which eliminates a similar cascade of job creation elsewhere.

A third, less–well–publicized study from the University of Tennessee is also based on the broken–windows fallacy.[5] Here the authors calculate the jobs created by forcing renewable energy to 25 percent of total energy nationwide. But they neglect to account for the cost (and lost jobs) of the taxes needed so the government could subsidize all that inefficient energy.

In a recent study of the economic impacts of restricting CO2 emissions, researchers at the Center for Data Analysis at The Heritage Foundation did not find an increase in employment; to the contrary, such restrictions resulted in rather significant job losses.[6] In some years, employment losses from the Lieberman–Warner restrictions would be 900,000 jobs. These job losses are net of any "green" jobs that are created.

"Green Collar" Jobs
When energy prices rise (whether due to changes in market conditions or regulation and taxes), markets will adjust in many ways. Consumers reduce consumption and buy more energy–efficient products. Producers economize on the use of energy by cutting production and purchasing more energy–efficient machinery.

Of course, some producers will see an increase in sales when energy prices rise. For example, manufacturers of heating and cooling equipment may increase sales as firms and households replace older air conditioners and furnaces with newer more efficient ones. This will increase the demand for labor, material, and capital used by the heating and cooling manufacturers. Those changes will induce yet other changes elsewhere in the economy as suppliers to the heating and cooling industry adjust their production. These sorts of responses have happened in the past and have been estimated using real data and are incorporated into the hundreds of equations built into the macroeconomic model used by the Center for Data Analysis.

Broken Ideas
Energy is a valuable input to the modern economy. Cutting CO2 makes less energy available, and when the impacts are traced through the economy, some jobs are created but more are lost. Counting only the jobs that are created distorts the analysis and invalidates the conclusions.

When all is said and done, restricting CO2 cuts energy, income, and jobs. Pretending that breaking windows creates employment may make choosing among alternatives easier, but it leads to bad policy.

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