

# **The Arkansas Economy: How Will Climate Change Legislation Impact Economic and Job Growth?**

**By**

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## **EXECUTIVE SUMMARY**

If current federal climate change legislation is enacted, the Arkansas economy is likely to experience slower growth in jobs and income according to a recent study by the Arkansas Policy Foundation and the American Council for Capital Formation. Arkansas' gross state product, employment, industrial output, state budget revenues and household income would fall relative to the baseline forecast. Higher energy costs resulting from the Waxman/Markey bill's mandatory carbon emission reductions, energy efficiency mandates and renewable portfolio standards (RPS) passed by the U.S. House of Representatives will impede recovery from the current recession and reduce state budget receipts.

### **Background on the Study**

This paper describes recent economic and energy trends in Arkansas and provides details on the impact of federal climate bills such as the Waxman/Markey bill on the state.

The U.S. Congress is considering far-reaching climate change legislation that would impose a cap-and-trade system requiring sharp reductions in greenhouse gases (GHGs) and mandate high levels of energy efficiency and renewable energy. The U.S. House of Representatives passed a 1500-page climate change bill (Waxman/Markey, H.R. 2454) by seven votes in June. Led by Senators John Kerry and Barbara Boxer, the U.S. Senate Environment and Public Works Committee passed a similar bill, S.1733, the Kerry/ Boxer bill, which has tighter near-term emission reduction targets than the Waxman/Markey bill.

Both federal bills would require reductions in GHGs beginning in 2012. The emission reduction targets would require a reduction of as much as 20 percent below 2005 levels in 2020 and an 83 percent reduction in 2050. Multiple economic analyses show that these federal climate bills would increase the price of electricity, gasoline and natural gas. In consequence, economic productivity, employment and household income would decline. The manufacturing sectors would be particularly impacted.

A recent macroeconomic study<sup>1</sup> conducted by the American Council for Capital Formation (ACCF) and the National Association of Manufacturers (NAM) found significant loss in

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<sup>1</sup> This analysis was undertaken by ACCF and NAM using NEMS/ACCF-NAM 2, a version of the National Energy Modeling System (NEMS) model, the model used by the U.S. Energy Information Administration (EIA) for its energy forecasting and policy analysis. ACCF and NAM applied input assumptions under two scenarios (high cost and low cost) investigating the sensitivity of assumptions that have proven in the past to significantly impact the cost of limiting CO2 emissions from energy.

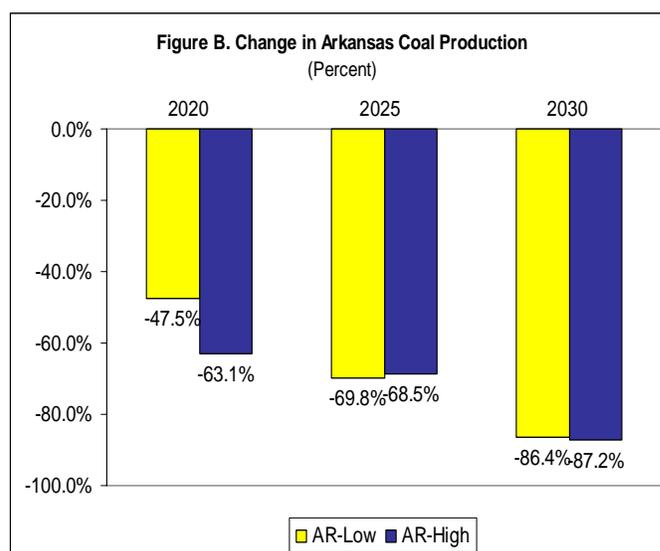
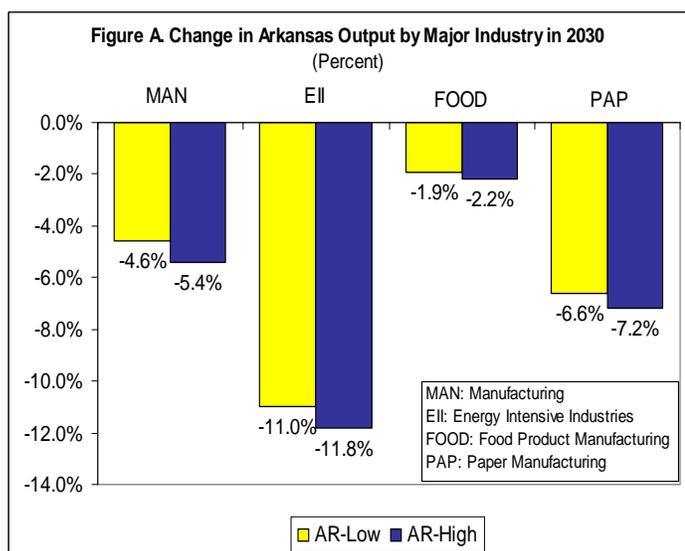
gross domestic product (GDP) as a result of enactment of the Waxman/Markey bill. The ACCF/NAM study found that the Waxman/Markey bill would reduce cumulative GDP by as much as \$3.1 trillion from 2012-2030. A loss of this magnitude would, in turn, reduce cumulative tax receipts from \$670 billion to \$1 trillion. Largely based on findings from the ACCF/NAM analysis, this study focuses on Arkansas and examines in more detail effects on key industrial sectors and employment in the state.

Arkansas, a state whose economy is tied to a strong, energy-intensive manufacturing sector, is particularly vulnerable to adverse impacts from federal climate change bills. Energy prices in Arkansas, a state which now depends on coal and natural gas for 70 percent of electric generation, would rise at a faster rate than in many other states. Compliance with the RPS would be disproportionately challenging for Arkansas. Like other Southern states, Arkansas does not have as much access to ready supplies of renewable energy from wind and solar.

## Key Findings

### Economic Impact of Climate Change Legislation

- ❖ If a cap-and-trade climate change bill similar to the Waxman/Markey bill (H.R. 2454) or the Kerry/Boxer bill (S.1733) is enacted, Arkansas is likely to experience a decrease in manufacturing output according to a recent macroeconomic analysis of H.R. 2454. Overall manufacturing output declines by 4.6 percent in the low cost case and by 5.4 percent in the high cost case in 2030 compared to the baseline forecast (see **Figure A**).
- ❖ Another important Arkansas industry, coal mining, falls steeply; declining by up to 63 percent in 2020, 70 percent in 2025 and 87 percent in 2030 (see **Figure B**).
- ❖ Gross state product falls by \$2.7 to \$3.7 billion in 2030. Such reductions in GSP will reduce state budget receipts and force policymakers to make hard choices.



- ❖ Arkansas will see a reduction in job growth; there will be 17,100 to 23,300 fewer jobs in 2030.
- ❖ Disposable income will fall by an average of \$433 to \$781 in 2030. Low-income families and the elderly will spend a higher proportion of their income on energy.

### **Economic and Employment Trends**

- ❖ Economic growth slowed in Arkansas in 2008 to 0.7%, down from 1.5% in 2007 as the U.S. recession deepened. Overall growth in 2008 was the same in Arkansas as in the United States (0.7%). Declines in output in 2008 in three key industries – manufacturing, transportation and warehousing and information processing – were responsible for the state’s slower growth in output.
- ❖ In contrast to the declines in manufacturing and other industries mentioned above, recent developments in the natural gas industry have had a positive impact on the state’s economy. For example, mining sector output grew by 4.9% and professional and technical services grew by 7.4% in 2008.
- ❖ Arkansas’ unemployment rate started to rise slowly in April 2008 and increased between April 2008 and October 2009, reaching to 7.6% in October 2009. In contrast, the U.S. unemployment rate was 10.2% in October.

### **Energy Price Trends**

- ❖ Over the past decade, electricity prices for residential, industrial and commercial customers in Arkansas have tended to be lower than those for the U.S. as a whole. For example, residential electricity prices averaged 7.88 cents per kilowatt hour in Arkansas compared to 9.14 cents/kwh in the U.S. over the 1997-2008 period. Industrial and commercial electricity prices in Arkansas averaged 23% less than in the U.S. as a whole from 1997 to 2008.
- ❖ Arkansas’ relatively favorable electricity prices are most likely due to its coal and natural gas resources, nuclear generating capacity, the absence of state renewable portfolio standards, and its regulatory structure. Favorable electricity prices are an important factor in a states’ ability to keep existing industries and in attracting new sources of employment.

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*Policymakers, private citizens, the business community and the media are exploring the question of how the Waxman/Markey or the Kerry/Boxer climate change bills being debated in Congress may affect Arkansas' economic and job growth. A recent macroeconomic analysis of the Waxman/Markey bill shows that in 2030, when the emission reduction targets are tighter and emission allowances are no longer being given away, Arkansas' Gross State Product declines by \$2.7 to \$3.7 billion dollars, manufacturing declines by 4.6 to 5.4 percent and there are between 17,100 and 23,300 fewer jobs in the state. First, this paper describes recent economic trends in Arkansas and second, it provides details on the impact of the Waxman/Markey bill on the state.*

## **Introduction and Overview**

As the debate over climate change policies continues among policymakers at the federal as well as the state and local levels, it is important for individuals, the business community, government officials and the media to understand the potential economic impacts on their state. For example, the Waxman/Markey bill, The American Clean Energy and Security Act of 2009 (H.R. 2454) which passed in the U.S. House of Representatives in June 2009, requires large reductions in greenhouse gas emissions, renewable portfolio standards for utilities and increases in energy efficiency across all sections of the economy.

The Waxman/Markey bill would have far-reaching impacts on states, including Arkansas, by raising energy prices, accelerating the use of renewable energy and pushing for higher levels of energy efficiency by households, business and government. In the Senate, S. 1733, the Clean Energy Jobs and American Power Act proposed by Senators John Kerry and Barbara Boxer, was voted out of the Committee on Environment and Public Works. The bill is similar to Waxman/Markey (H.R. 2454). This paper provides an overview of the current Arkansas economy and describes what changes, in terms of employment and income and other economic variables, can be expected if H.R. 2454 or a similar climate change bill is enacted by the 111<sup>th</sup> Congress. The economic impacts of climate policy legislation on Arkansas described here are based, in part, on an earlier analysis of the Waxman/Markey bill sponsored by the American Council for Capital Formation and the National Association of Manufactures (see <http://www.accf.org/publications/126/accf-nam-study> for the earlier report).

## Recent Economic Trends in Arkansas

- **Economic Growth and Real GSP by Industry**

Economic growth slowed in Arkansas in 2008 to 0.7%, down from 1.5% in 2007 as the U.S. recession deepened. Overall growth in 2008 was the same in Arkansas as in the United States (0.7%). Declines in output in 2008 in three key industries – manufacturing (4.8%), transportation and warehousing (4.7%) and information processing (3.9%) – were responsible for the state’s slower growth in output. (See Table 1.)

Table 1. Arkansas Real Gross Domestic Product by Industry (millions of chained 2000 dollars)					
	1998	2007	2008	Change 98-08	Change 07-08
All industry total	64,274	78,716	79,245	23.3%	0.7%
Private industries	56,140	69,187	69,595	24.0%	0.6%
Agriculture, forestry, fishing, and hunting	2,040	2,541	2,564	25.7%	0.9%
Mining	359	549	576	60.4%	4.9%
Utilities	1,591	1,473	1,518	-4.6%	3.1%
Construction	3,005	2,306	2,307	-23.2%	0.0%
Manufacturing	14,360	15,913	15,154	5.5%	-4.8%
Durable goods	7,935	8,940	8,430	6.2%	-5.7%
Nondurable goods	6,431	6,955	6,705	4.3%	-3.6%
Wholesale trade	3,993	5,351	5,387	34.9%	0.7%
Retail trade	4,309	7,339	7,518	74.5%	2.4%
Transportation and warehousing, excluding Postal Service	3,000	3,897	3,713	23.8%	-4.7%
Information	2,063	4,660	4,478	117.1%	-3.9%
Finance and insurance	2,770	3,044	3,054	10.3%	0.3%
Real estate and rental and leasing	5,450	6,544	6,770	24.2%	3.5%
Professional and technical services	1,860	3,292	3,536	90.1%	7.4%
Management of companies and enterprises	2,038	1,481	1,622	-20.4%	9.5%
Administrative and waste services	1,257	1,571	1,675	33.3%	6.6%
Educational services	223	291	306	37.2%	5.2%
Health care and social assistance	4,393	5,816	6,036	37.4%	3.8%
Arts, entertainment, and recreation	340	370	382	12.4%	3.2%
Accommodation and food services	1,414	1,791	1,848	30.7%	3.2%
Other services, except government	1,701	1,653	1,671	-1.8%	1.1%
Government	8,138	9,558	9,670	18.8%	1.2%

**Source:** Regional Economic Accounts, Bureau of Economic Analysis, U.S. Department of Commerce.

- **Role of Mining and Professional and Technical Services in Arkansas’ Economy**

In contrast to the declines in manufacturing and other industries mentioned above, recent developments in the natural gas industry have had a positive impact on the state’s economy. These impacts can be seen in the mining sector as well as in professional and technical services. For example, real (inflation adjusted) mining sector output grew by 4.9% and professional and technical services grew by 7.4% in 2008. (See Table 1.)

With technological improvements, unconventional natural gas reservoirs such as Fayetteville Shale are expected to continue to increase Arkansas’ economic growth. A recent economic impact study conducted by the Center for Business and Economic Research at the Sam M. Walton College of Business quantifies the direct impact (exploration, extraction, production, transportation, storage, and distribution) of the reservoir as well as the indirect (supply chain oriented) and induced (personal expenditure related) impacts. Over the next five years, Fayetteville Shale is expected to create \$17.9 billion in economic output and increase employment by more than 11,000 people. (See Table 2.)

Table 2. Estimated Economic Impact of Fayetteville Shale on Arkansas Economy				
Economic Output Impact (in millions)				
Year	Direct Impact	Indirect Impact	Induced Impact	Total Impact
2008	2,403	618.2	494.0	3,515
2009	2,313	533.7	480.1	3,327
2010	2,548	556.2	524.4	3,629
2011	2,634	567.6	532.9	3,735
2012	2,582	555.8	512.8	3,651
Total	12,481	2,831.5	2,544.3	17,856
Employment				
Year	Direct Impact	Indirect Impact	Induced Impact	Total Impact
2008	4,720	2,904	4,819	12,442
2009	4,498	2,327	4,588	11,413
2010	4,813	2,304	4,909	12,026
2011	4,789	2,285	4,884	11,958
2012	4,512	2,186	4,601	11,299

**Source:** "Projecting the Economic Impact of the Fayetteville Shale Play for 2008-2012," Center for Business and Economic Research, Sam M. Walton College of Business, March 2008.

- **Employment in the State**

Overall employment in Arkansas grew at a rate of 1% in 2008. The positive impact of natural gas developments can be seen in the breakdown of state employment data by industry. In 2008, employment in mining grew by 2600 workers, up 23% from 2007 levels. (See Table 3) Over the last decade, employment in the mining industry grew by 104%. In contrast, U.S. employment growth for the mining industry was only 14.2% in 2008 and 39.4% over the last decade.

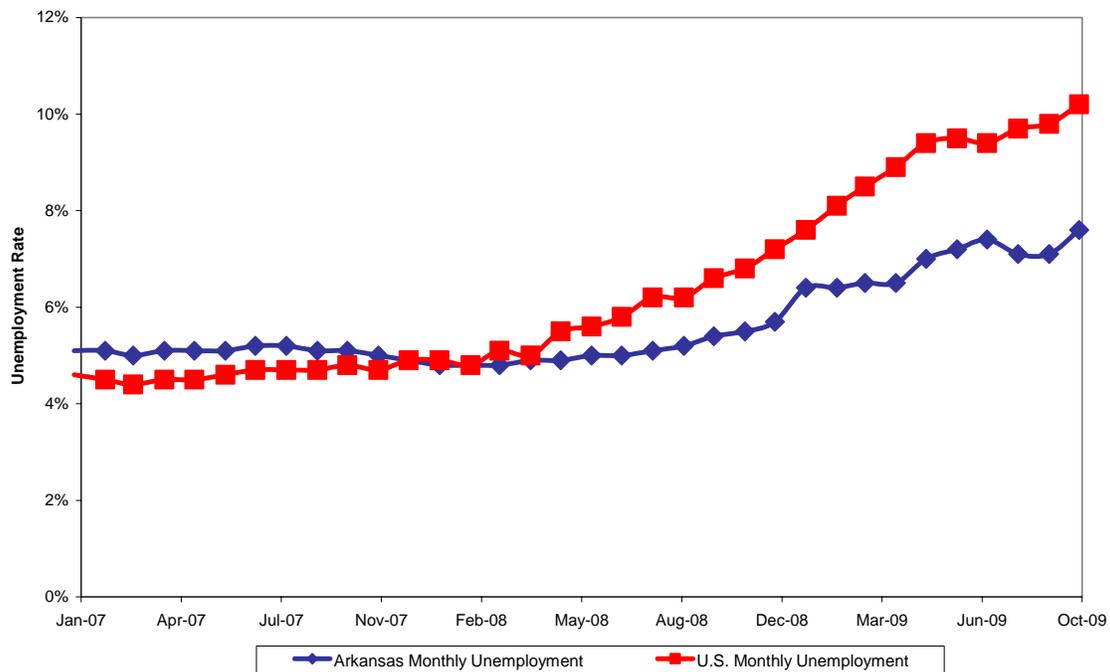
Table 3. Arkansas Employment by Industry, 1998-2008					
	1998	2007	2008	Change 98-08	Change 07-08
Total employment	1,453,311	1,583,019	1,599,446	10.1%	1.0%
By industry					
Farm employment	65,270	54,311	55,503	-15.0%	2.2%
Nonfarm employment	1,388,041	1,528,708	1,543,943	11.2%	1.0%
Private employment	1,186,827	1,298,929	1,312,538	10.6%	1.0%
Forestry, fishing, and related activities	17,052	14,353	14,447	-15.3%	0.7%
Mining	6,729	11,170	13,741	104.2%	23.0%
Utilities	7,160	7,105	7,101	-0.8%	-0.1%
Construction	86,730	101,454	103,222	19.0%	1.7%
Manufacturing	243,596	194,250	187,710	-22.9%	-3.4%
Wholesale trade	49,369	52,530	53,020	7.4%	0.9%
Retail trade	165,268	166,809	166,783	0.9%	0.0%
Transportation and warehousing	68,932	76,317	74,835	8.6%	-1.9%
Information	21,755	22,860	21,811	0.3%	-4.6%
Finance and insurance	46,695	54,364	55,228	18.3%	1.6%
Real estate and rental and leasing	36,382	52,518	56,712	55.9%	8.0%
Professional, scientific, and technical services	43,439	61,317	62,670	44.3%	2.2%
Management of companies and enterprises	20,122	25,390	26,354	31.0%	3.8%
Administrative and waste services	61,936	79,825	81,138	31.0%	1.6%
Educational services	11,747	18,336	18,995	61.7%	3.6%
Health care and social assistance	128,919	159,955	165,518	28.4%	3.5%
Arts, entertainment, and recreation	14,383	18,054	18,755	30.4%	3.9%
Accommodation and food services	77,931	96,607	97,974	25.7%	1.4%
Other services, except public administration	78,682	85,715	86,524	10.0%	0.9%
Government and government enterprises	201,214	229,779	231,405	15.0%	0.7%
Federal, civilian	20,697	20,908	21,281	2.8%	1.8%
Military	19,176	20,610	18,741	-2.3%	-9.1%
State and local	161,341	188,261	191,383	18.6%	1.7%

**Source:** Regional Economic Accounts, Bureau of Economic Analysis, U.S. Department of Commerce.

- **Unemployment Rates in Arkansas Compared to the United States**

Throughout the current recession, the Arkansas economy has fared better than the U.S. as a whole. According to the National Bureau of Economic Research, the current recession started in December 2007. **Figure 1** shows that starting in February 2008, the unemployment rate in Arkansas has consistently been below the U.S. unemployment rate. Arkansas' seasonally adjusted unemployment rate started to increase slowly in April 2008 and saw an upward trend between April 2008 and October 2009, reaching to 7.6% in October 2009. The highest percentage point increase was in January 2009, when the rate jumped to 6.4%, a 0.7 percentage point increase. However, over the last 10 years, the average unemployment rates in the U.S. and Arkansas were identical (5%).

Figure 1. Arkansas Unemployment versus U.S. (2007-2008)



Source: Local Area Unemployment Statistics, Bureau of Labor Statistics, United States Department of Labor.

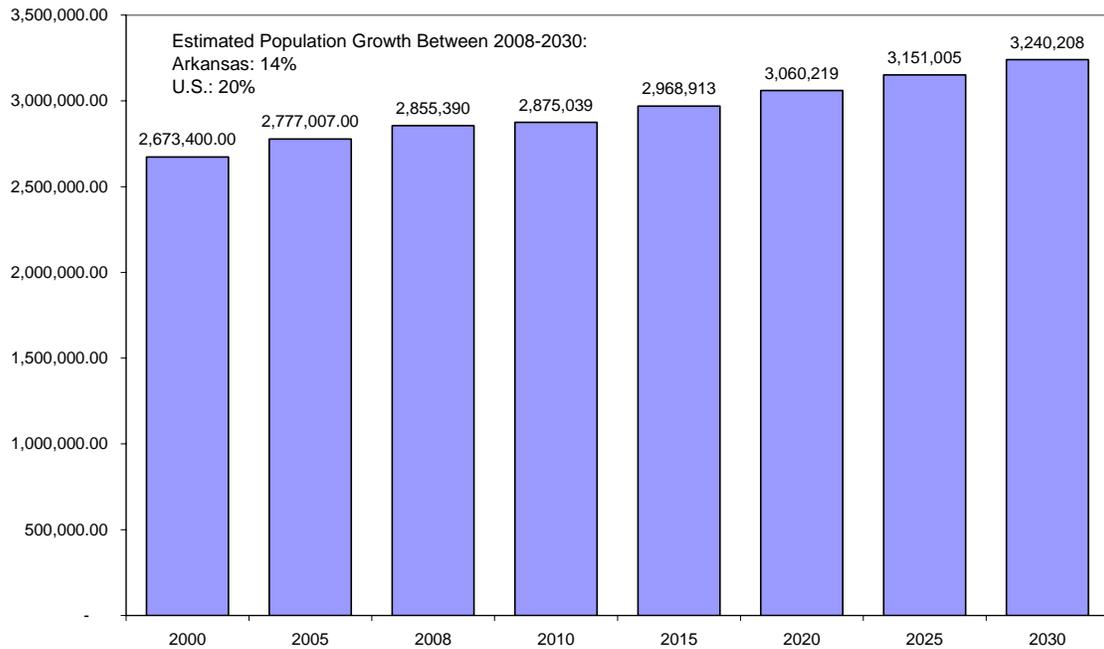
- **Population Growth in Arkansas**

According to latest Census estimates, the total population of Arkansas was 2.9 million in 2008, while the total U.S. population was 304 million. The state's population is projected to increase 14% between 2008 and 2030. (See **Figure 2.**) U.S. projections show a 20% increase over the same time period.

- **Real Per Capita GSP in Arkansas**

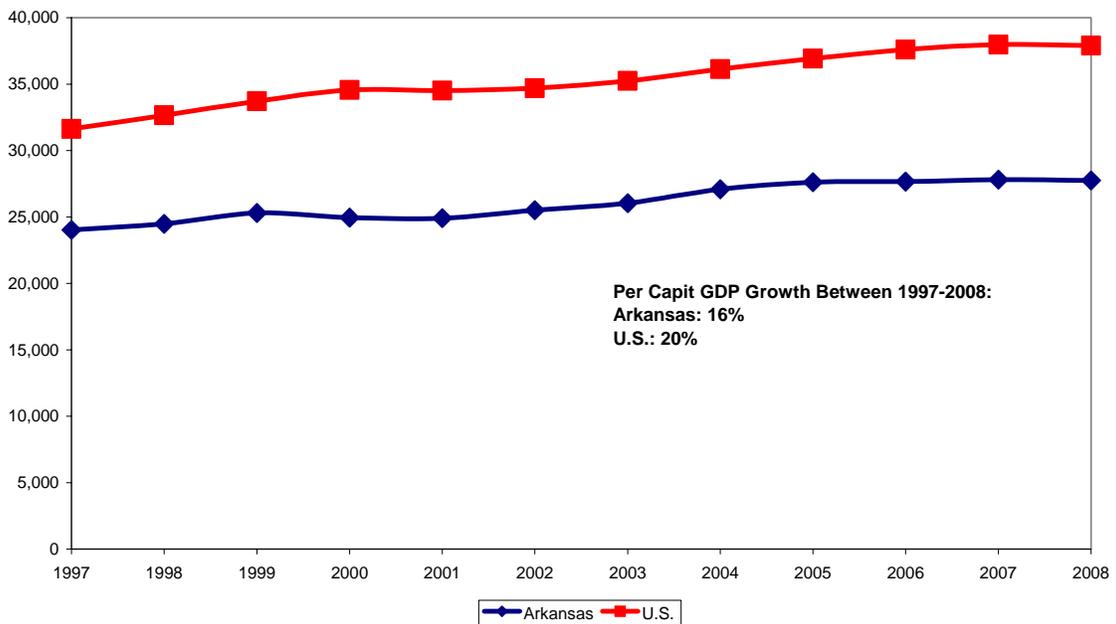
Over the past decade, Arkansas' real per capita GSP has consistently been below the U.S. average. (See **Figure 3.**) Between 1997 and 2008, Arkansas' real per capita GSP grew 16% while U.S. real per capita GDP grew 20%. In 2008, only West Virginia (\$25,533) and Mississippi (\$24,403) had lower per capita GSP than Arkansas (\$27,753).

**Figure 2. Arkansas Population Projection**



Source: State Population Projections, U.S. Census Bureau.

**Figure 3. Arkansas and U.S. Real Per Capita GDP, 1997-2008  
(chained 2000 dollars)**



Source: Regional Economic Accounts, Bureau of Economic Analysis, U.S. Department of Commerce.

## The Arkansas Energy Sector: Prices, Electricity Generation and Greenhouse Gas Emissions

- **Prices**

Over the past decade, electricity prices for residential, industrial and commercial customers in Arkansas have tended to be lower than those for the U.S. as a whole. For example, residential electricity prices averaged 7.88 cents per kilowatt hour in Arkansas compared to 9.14 cents/kwh in the U.S. over the 1997-2008 period. (See **Table 4.**) Industrial and commercial electricity prices in Arkansas averaged 23% less than in the U.S. from 1997 to 2008. Over the same period, natural gas prices have tended to slightly exceed the U.S. average except for commercial customers. (See Table 4.)

The causes of Arkansas' relatively favorable electricity prices are most likely due to its coal and natural gas resources, nuclear generating capacity, the absence of state renewable portfolio standards, and its regulatory structure.

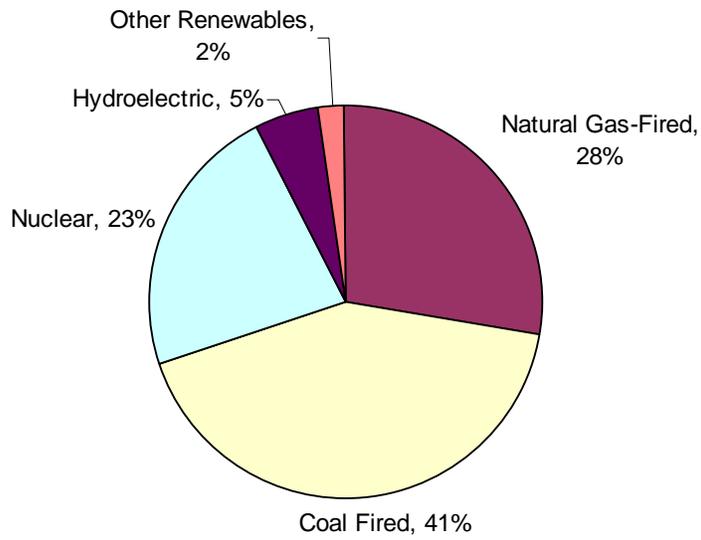
<b>Table 4. Energy Prices in Arkansas and in U.S.</b>				
	<b>Arkansas</b>	<b>U.S.</b>	<b>Arkansas</b>	<b>U.S.</b>
	<i>Average (1997-2008)</i>		<i>Aug-09</i>	
<i>Electricity (cents/kwh)</i>				
Residential	7.88	9.14	9.87	12.05
Industrial	4.56	5.31	6.23	7.17
Commercial	6.26	8.31	7.96	10.60
<i>Natural Gas (\$/thousand cu ft)</i>				
Residential	10.36	9.94	17.43	15.15
Industrial	6.84	5.81	7.25	4.31
Commercial	7.91	8.56	10.65	9.31

Source: Energy Information Administration, Department of Energy.

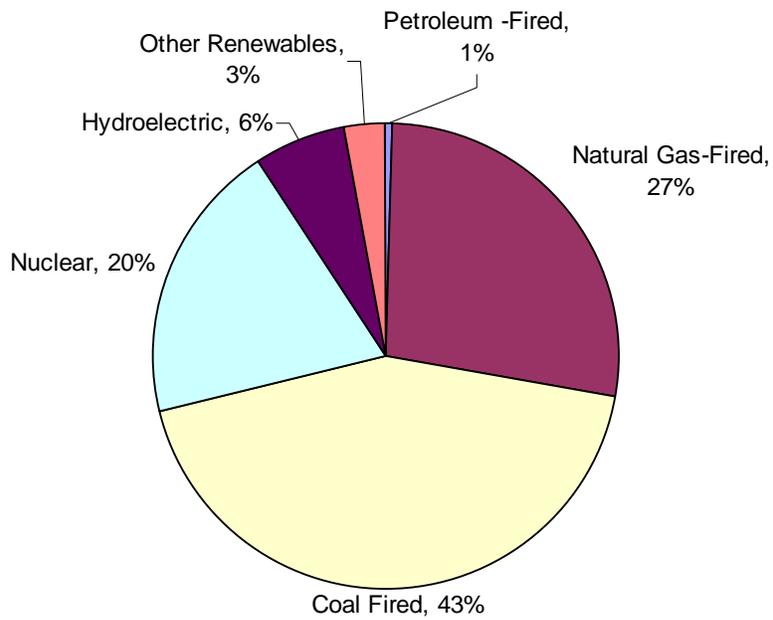
- **Electricity Generation**

The sources of electricity generation in Arkansas closely mirror that of the U.S. as a whole. For example, 41% of Arkansas' electricity is generated from coal-fired plants. For the U.S. as a whole the figure is 43%. Natural gas-fired plants are responsible for 28% of electricity in Arkansas and 27% in U.S. (See **Figure 4.**) Arkansas also has similar nuclear and renewable energy electricity sources as the rest of the U.S.

**Figure 4. Net Electricity Generation by Energy Source**



**ARKANSAS**



**U.S.**

\* Net generation data based on latest available month, August 2009.

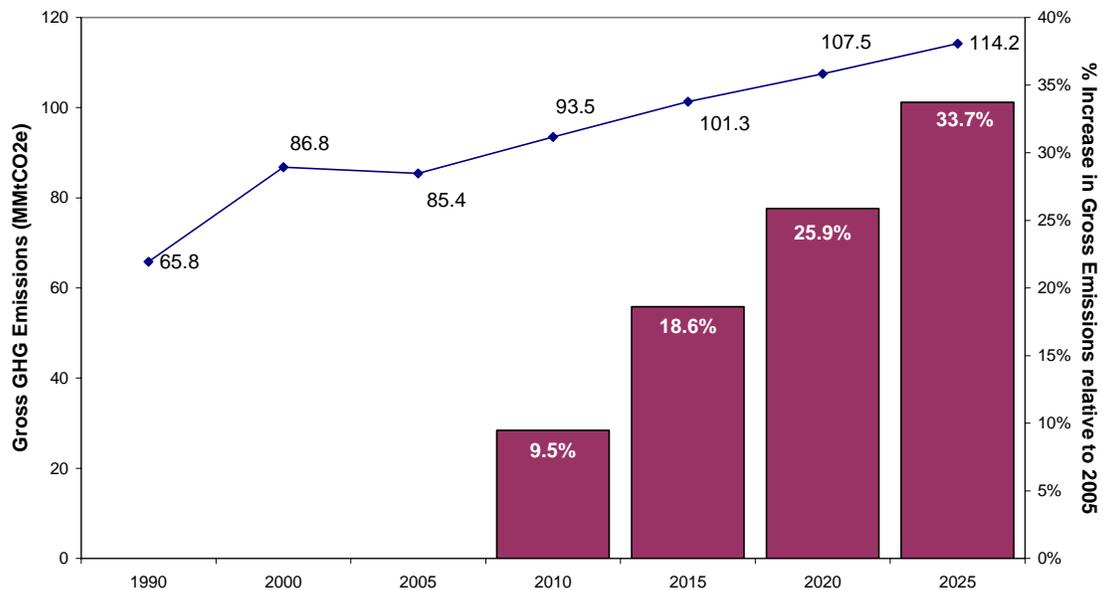
Source: Energy Information Administration, Department of Energy

- **Greenhouse Gas Emissions: Arkansas and the United States**

Arkansas’ greenhouse gas emissions (GHGs) are projected to increase significantly by 2025 according to a report by the Center for Climate Strategies (CCS). Relative to 2005 emission levels, gross GHGs are projected to rise by 34% by 2025 to 114.2 million metric tons of CO<sub>2</sub> equivalent (MMtCO<sub>2</sub>e). (See **Figure 5.**) Arkansas’ gross GHG emissions amounted to about 1.2% of the U.S. total in 2005. Over the 1990-2005 period, Arkansas’ emissions rose by about 30% compared to 16% for the U.S. The primary causes of the projected increased emissions in Arkansas are population growth, growth in electricity generation, fuel use and other GHG emitting activities such as agriculture and natural gas production. Net GHG emissions, which take account of carbon sinks from Arkansas’ forests, land use and agricultural changes, will rise by 44.6% by 2025 to 93.4 MMtCO<sub>2</sub>e according to the CCS report. (See **Figure 6.**)

Per capita GHG emissions in Arkansas are projected to continue growing from 33 tons per person in 2010 to 36 tons in 2025. In contrast, U.S. per capita emissions are projected to decline from 23 tons per person in 2010 to 22 tons in 2025. The decline in U.S. per capita emissions assumes no additional measures such as federal “cap and trade” legislation to curb energy use are enacted. By 2025, Arkansas’ per capita emissions will be 65 percent higher than the average for the U.S. (See **Figure 7.**)

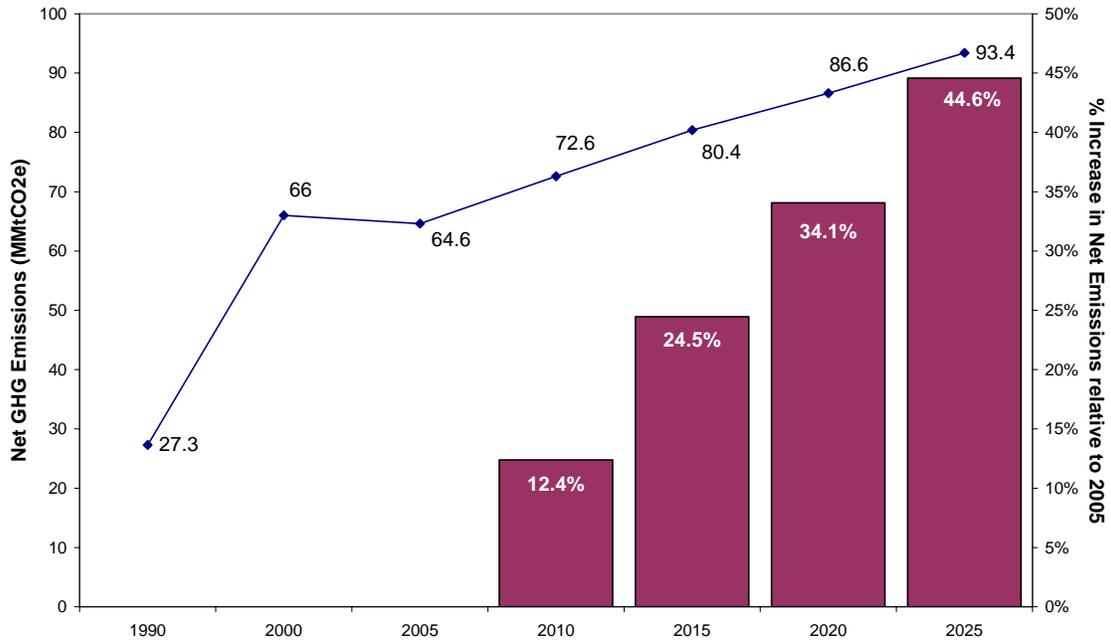
**Figure 5. Arkansas Gross GHG Emissions\* and Percent Increase Relative to 2005**



Source: "Final Arkansas Greenhouse Gas Inventory and Reference Case Projections, 1990-2025", Center for Climate Strategies. [www.arclimatechange.us/ewebeditpro/items/O94F20076.pdf](http://www.arclimatechange.us/ewebeditpro/items/O94F20076.pdf)

\* Emissions are consumption basis and it excludes forestry and land use sinks.

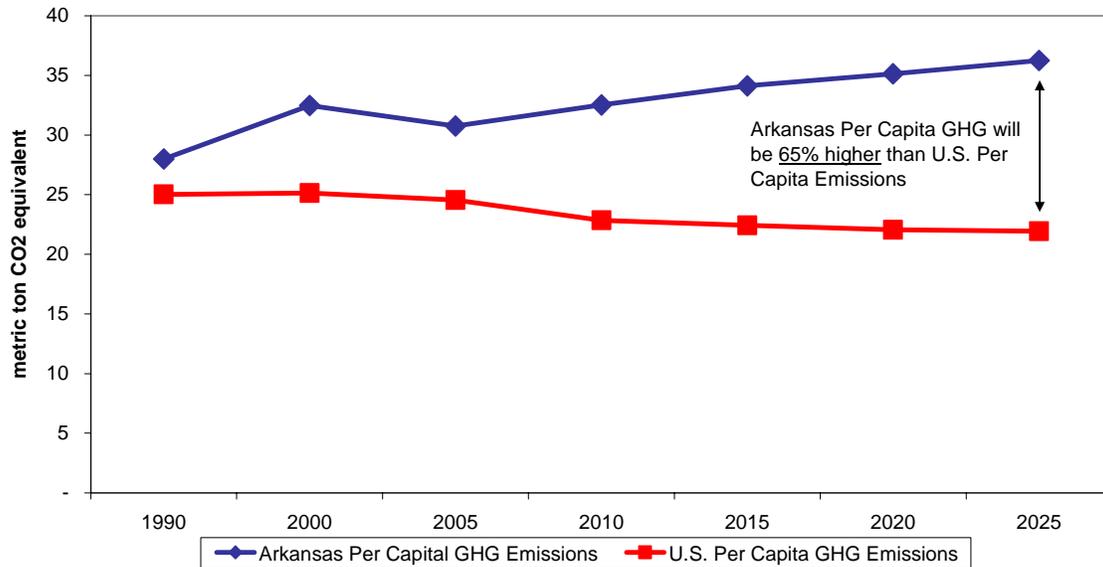
**Figure 6. Arkansas Net GHG Emissions\* and Percent Increase Relative to 2005**



Source: "Final Arkansas Greenhouse Gas Inventory and Reference Case Projections, 1990-2025", Center for Climate Strategies. [www.arclimatechange.us/ewebeditpro/items/O94F20076.pdf](http://www.arclimatechange.us/ewebeditpro/items/O94F20076.pdf)

\* Emissions are consumption basis and it includes forestry and land use sinks.

**Figure 7. Per Capita GHG Emissions: Arkansas versus U.S.**



Source: Arkansas GHG Emission Data: "Final Arkansas Greenhouse Gas Inventory and Reference Case Projections, 1990-2025," Center for Climate Strategies, October 2008

U.S. GHG Emission Data: Annual Energy Outlook 2009 and Emissions of Greenhouse Gases Report, Energy Information Administration, Department of Energy.

Population: U.S. Census Bureau

## Federal Climate Change Legislation: Potential Economic Impact on Arkansas

- **The Waxman/Markey Bill (H.R. 2454)**

The Waxman/Markey bill (H.R. 2454) passed the U.S. House of Representatives in June 2009. (A similar bill, S. 1733, “The Clean Energy Jobs and American Power Act, was voted out of the Senate Committee on Environment and Public Works on November 5, 2009) The major differences between S. 1733 and the House bill are that the Senate bill requires sharper emission cuts by 2020 than Waxman/Markey, provides fewer carbon allowances to the business sector, allows fewer international offsets and does not have a renewable portfolio standard (RPS) for utilities. (An RPS bill passed earlier this year out of a Senate Committee.) The American Council for Capital Formation and the National Association of Manufacturers had previously analyzed the economic impact of the Waxman/ Markey bill on the U.S. and on all 50 states, including Arkansas. (See analysis at <http://www.accf.org/publications/126/accf-nam-study>.)

The American Clean Energy and Security Act (Waxman/Markey [W/M] bill), H.R. 2454, sets targets that would reduce GHG emissions to 17% below 2005 levels by 2020, 42% below 2005 levels by 2030 and 83% below 2005 levels by 2050. In addition, the bill sets targets for renewable energy, carbon capture and storage, low carbon transportation fuels, clean electric vehicles, smart grid and electricity transmission. By 2020, utilities must use renewable energy and energy efficiency savings to satisfy 20% of their total load. The bill also requires increases in energy efficiency across all sectors of the economy. The ACCF/NAM report analyzed the W/M bill under low and high cost cases with respect to a baseline that projects the future in the absence of the bill.

Because most of the emission permits to emit a ton of GHGs are given away to industry up until the 2027-2030 time period, the cost of meeting reduction targets is less and the overall economic burden is less than if all permits were auctioned to the highest bidder starting in 2012. After 2027, most permits to emit a ton of carbon will have to be purchased on the open market, thus the economic burden on industry and households becomes much greater.

This analysis was undertaken by ACCF and NAM using NEMS/ACCF-NAM 2<sup>2</sup>, a version of the National Energy Modeling System (NEMS) model, the model used by the U.S. Energy Information Administration (EIA) for its energy forecasting and policy analysis. ACCF and NAM applied input assumptions under two scenarios (high cost and low cost) investigating the sensitivity of assumptions that have proven in the past to significantly impact the cost of limiting CO<sub>2</sub> emissions from energy. The ACCF/NAM input assumptions embody judgment on the likely cost and availability of new technologies in the early decades of a long-term effort to reduce greenhouse gas emissions as well as energy efficiency and renewable electricity standards. These

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<sup>2</sup> The term “NEMS/ACCF-NAM 2” is used in this report to distinguish NEMS runs conducted in this project from NEMS runs conducted by EIA, and from those conducted for ACCF and NAM in 2008 analyzing the Lieberman-Warner bill (S. 2191).

assumptions include the availability of nuclear power technology for electric generation, the availability of carbon capture and storage for more efficient coal and natural gas-based power generation technologies, the availability of wind and biomass technologies. The ACCF/NAM input assumptions also included assumptions regarding the likely availability of domestic and international offsets - - key factors influencing analysis of the cost of limiting greenhouse gas emissions.

Based on the ACCF/NAM analysis of the Waxman Markey bill, the ACCF and the Arkansas Policy Foundation have expanded the original 2 page report (see report at <http://www.accf.org/media/docs/nam/2009/Arkansas.pdf>) on the economic impact on Arkansas by examining in more detail the effects that major provisions of the bill would have on employment and output in key industrial sectors and on jobs in Arkansas.

- **W/M’s Impact on Energy Prices**

Under a cap and trade system for GHG emission reduction, there is risk and uncertainty for business and households (over and above normal market risk) about energy prices due to the unpredictability of the price of a permit to emit a ton of carbon. This uncertainty will increase the cost of capital for new investment and thus tend to retard growth in all types of new investment.

Most energy prices would rise under W/M, particularly coal, oil and natural gas. By 2015, gasoline would increase between 6% and 9%, electricity between 5% and 8% and natural gas between 16% and 25%. Arkansas would find the renewable portfolio standards in W/M expensive and challenging since, like many other Southern states, it does not have easy access to large quantities of low cost renewable energy.

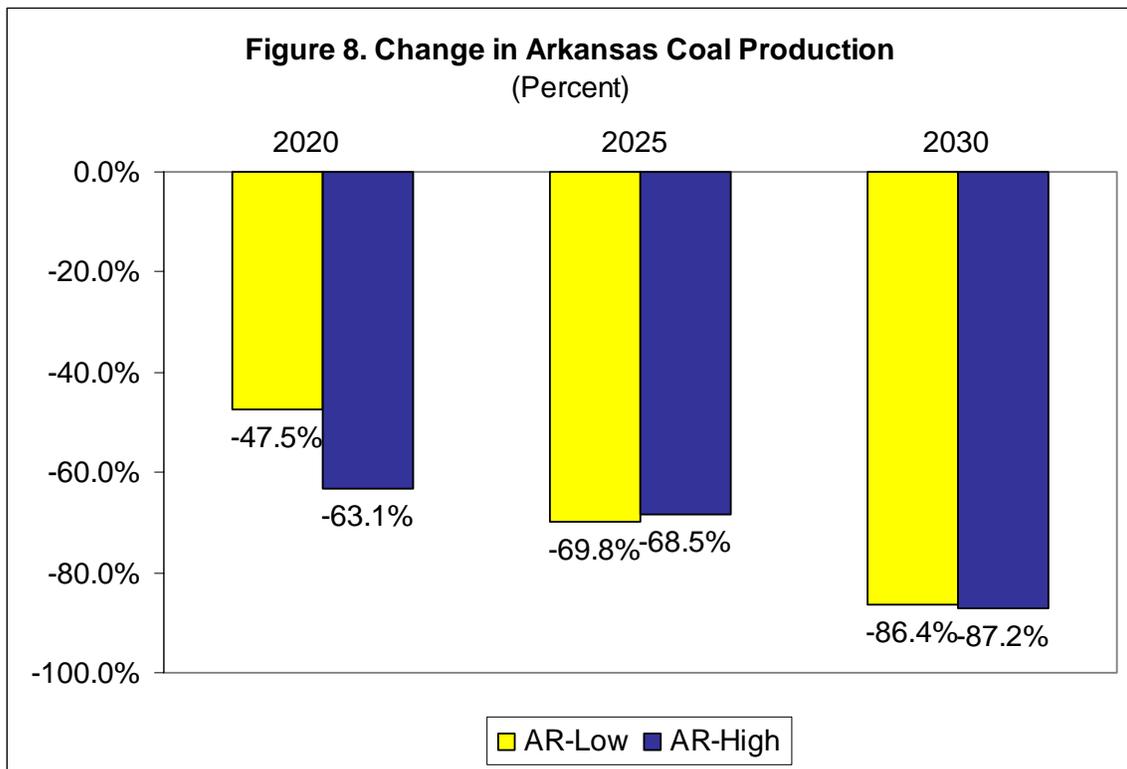
By 2030, gasoline prices increase between 20% and 26% while electricity prices increase by up to 54% and natural gas by up to 77%. **Table 5** shows the increase in energy prices faced by a typical Arkansas household compared to national household increases over the 2020-2030 period.

Sector	Year	Arkansas		US	
		Low	High	Low	High
Electricity (Residential)	2020	1.8%	10.2%	5.0%	7.9%
	2025	1.6%	11.8%	4.9%	11.5%
	2030	31.3%	54.1%	31.4%	50.0%
Gasoline	2020	8.6%	11.3%	8.3%	11.1%
	2025	12.2%	16.3%	12.0%	16.0%
	2030	19.5%	25.5%	20.0%	26.1%
Natural Gas (Residential)	2020	-3.2%	0.6%	-3.3%	0.1%
	2025	5.4%	10.6%	4.8%	10.1%
	2030	58.4%	76.8%	56.3%	73.5%

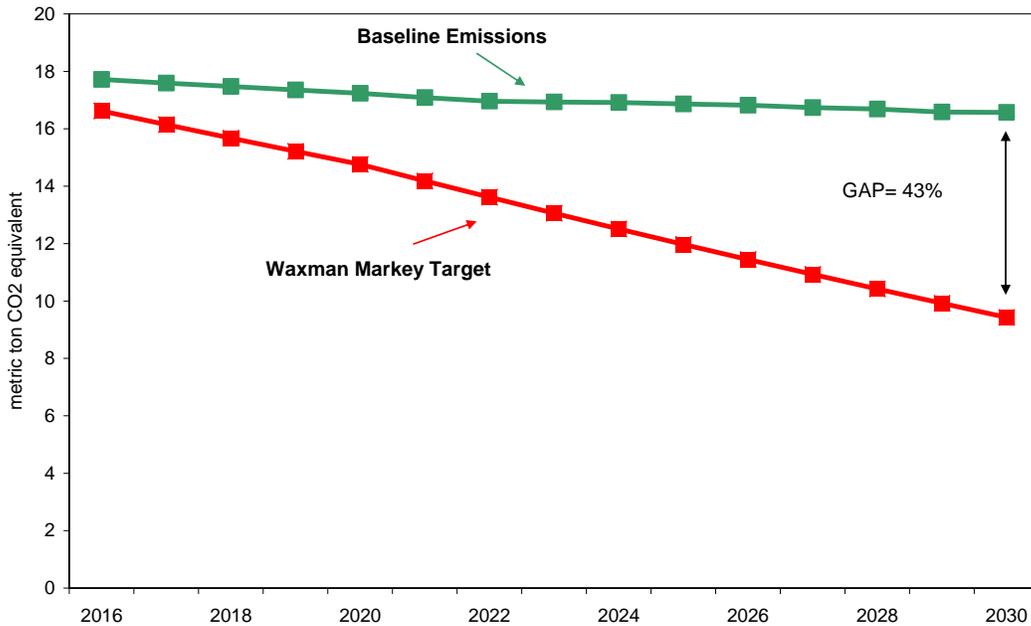
- **Factors Contributing to Higher Electricity Prices**

W/M would reduce GHG emissions from all sectors of the economy (transportation, residential, commercial, and industry); however, as the largest emitter of GHGs, the primary impact would fall on the electric sector. W/M would result in the electric industry shutting down most carbon-based generation and/or using expensive, as yet unproven technology, to capture and store CO<sub>2</sub>. To meet the stringent goals of W/M, the electric industry would also have to substitute high cost technologies, such as biomass and wind, for conventional generation. (See **Figure 8** for decrease in Arkansas coal production over the 2020-2030 period.)

Per capita emissions would have to drop significantly for the U.S. as whole, per capita emissions would have to be reduced from 17 tons under the baseline forecast to 9 tons in 2030. (See **Figure 9**.)



**Figure 9. Macroeconomic Impact of Waxman Markey Bill:  
Per Capita Energy Sector CO2 Emissions in U.S.**

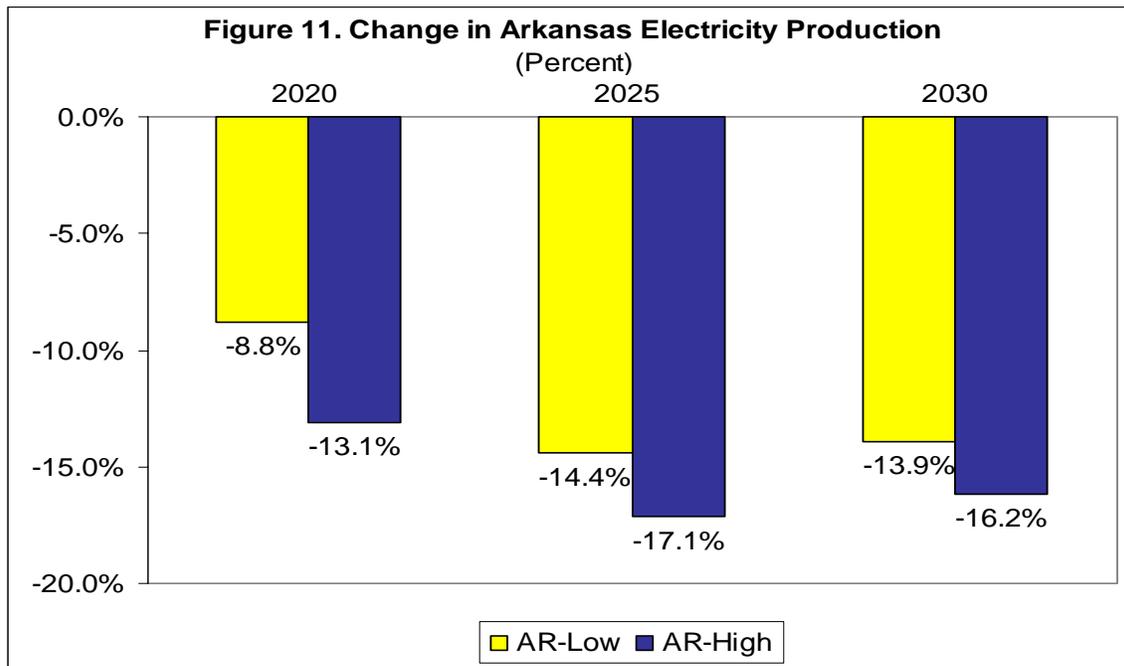
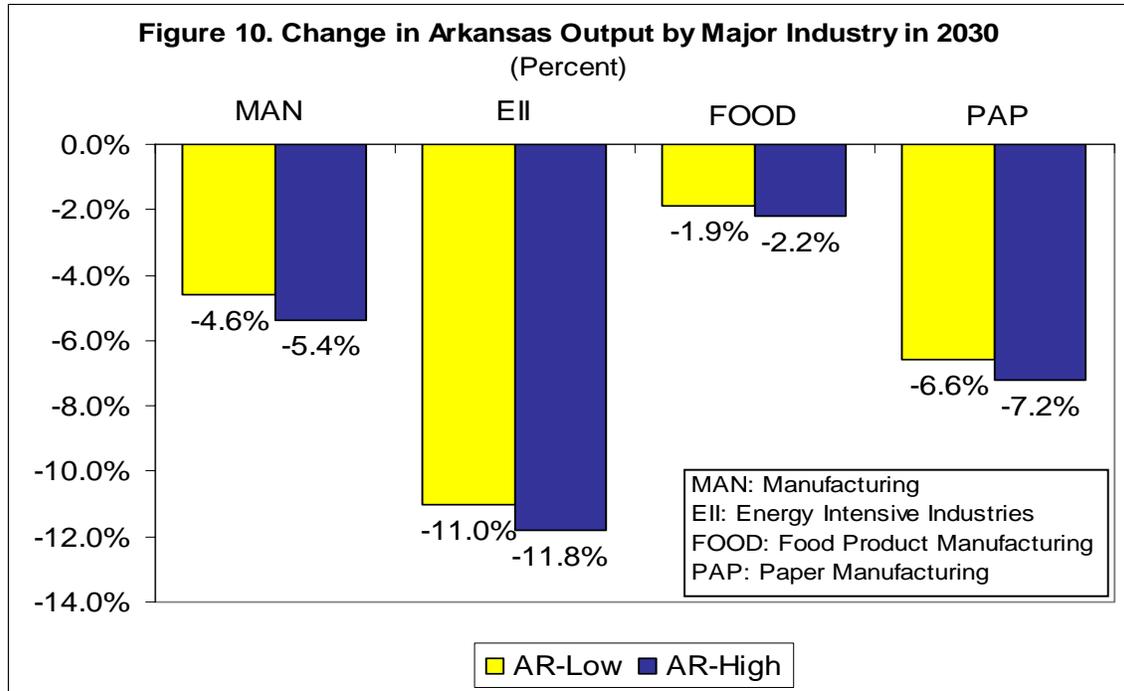


- **Impact on Fayetteville Shale Development**

The Waxman/Markey bill’s cap and trade provisions will tend to make natural gas a more desirable fuel for utilities and possibly also for transportation fuels since it emits about half of the CO2 as coal when burned. Thus, areas like Arkansas which have substantial natural gas reserves and production could experience increased demand. On the other hand, the natural gas producers and utilities in Arkansas would face the same requirement to provide an emission allowance (or emission credit) for every ton of CO2 emitted so the cost of producing and using gas would rise. As a result, Arkansas manufacturers and other industries would face higher energy costs due to the cap and trade emission and would thus be less competitive and tend to hire fewer workers than under the baseline forecast. In 2008, mining employment was less than 1% of total employment in the state so that even if it doubled or tripled over time it would not likely outweigh the loss of jobs in other industries caused by the cost of the cap and trade, RPS and energy efficiency provisions in the Waxman/Markey bill.

- **Impact on Industrial Output**

Arkansas’ major economic sectors will be affected by emission caps (**Figure 10**). The current two largest sectors, food product manufacturing and paper manufacturing, show decreases in output of 1.9% to 2.2% and 6.6% to 7.2%, respectively in 2030. Overall manufacturing will suffer output losses of between 4.6% and 5.4% by 2030, while output from energy intensive sectors falls between 11.0% and 11.8%. Arkansas’ electricity production would fall between 14% and 16%. (**Figure 11**) These continued losses will have a lasting effect on the economic base of Arkansas.



As shown in **Table 6**, while all major manufacturing sectors in Arkansas decline under Waxman/Markey, certain energy-intensive sectors like primary metal manufacturing and nonmetallic mineral product and chemical manufacturing tend to be especially hard hit. Output in these industries declines by as much as 14 to 25% by 2030 compared to the baseline forecast.

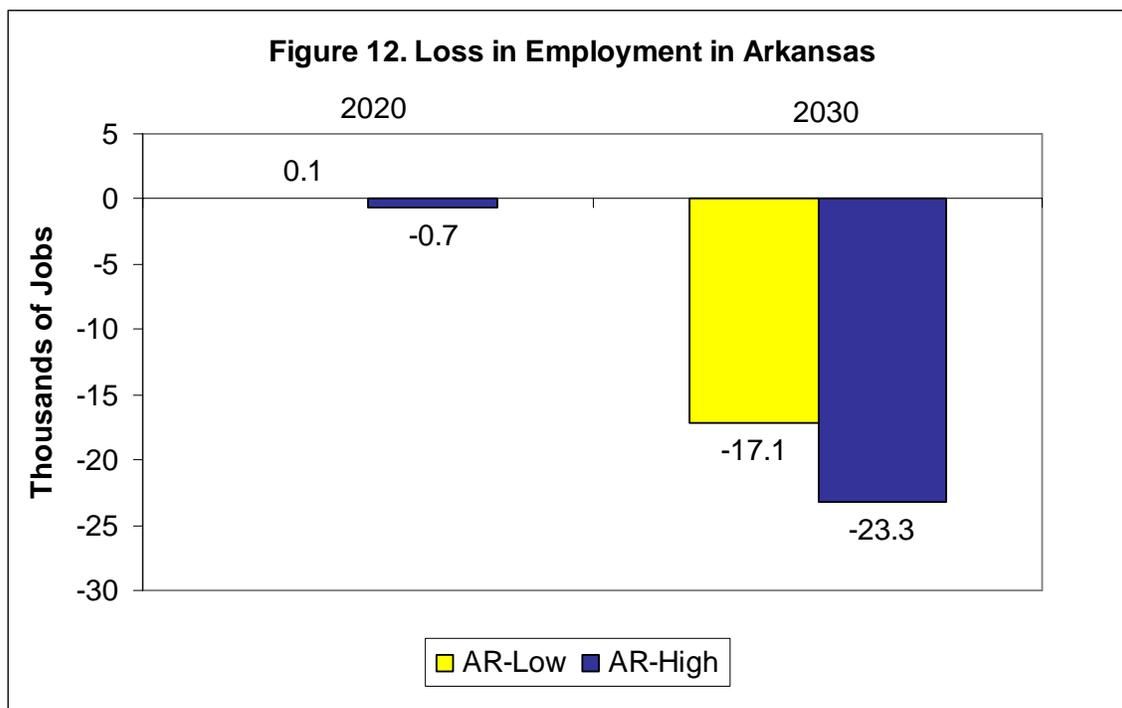
Table 6. Change in Arkansas Output by Major Manufacturing Sector Relative to Baseline (Percent)				
	Low Cost Case		High Cost Case	
	2020	2030	2020	2030
<i>Manufacturing</i>	-3.5%	-4.6%	-3.7%	-5.4%
Wood product manufacturing	-4.3%	-6.9%	-4.5%	-7.6%
Fabricated metal product manufacturing	-3.7%	-5.8%	-3.9%	-6.9%
Machinery manufacturing	-6.6%	-7.1%	-7.0%	-8.7%
Computer and electronic product manufacturing	-3.6%	-4.9%	-3.8%	-5.9%
Electrical equipment and appliance manufacturing	-4.7%	-5.7%	-5.0%	-7.0%
Motor vehicle, body, trailer, and parts manufacturing	-4.8%	-7.5%	-5.0%	-8.0%
Furniture and related product manufacturing	-2.7%	-5.6%	-2.8%	-6.2%
Miscellaneous manufacturing	0.0%	-0.5%	0.0%	-0.3%
Food product manufacturing	-1.8%	-1.9%	-1.9%	-2.2%
Textile and textile product mills	-3.5%	-4.9%	-3.7%	-5.5%
Apparel manufacturing	-6.2%	-7.5%	-6.7%	-8.7%
Printing and related support activities	-0.3%	-1.0%	-0.3%	-1.1%
<i>Energy Intensive Manufacturing</i>	-6.7%	-11.0%	-7.0%	-11.8%
Nonmetallic mineral product manufacturing	-10.4%	-17.8%	-10.9%	-19.2%
Primary metal manufacturing	-13.4%	-22.8%	-14.2%	-25.5%
Paper manufacturing	-3.9%	-6.6%	-4.1%	-7.2%
Petroleum and coal products manufacturing	-4.7%	-7.5%	-4.8%	-7.8%
Chemical manufacturing	-7.8%	-12.9%	-8.2%	-13.9%
Plastics and rubber products manufacturing	-5.9%	-10.8%	-6.2%	-11.7%

- **Impact on Employment in Arkansas**

The jobs impact of W/M is delayed by the free allocation of permits and generous carbon offsets. By 2030, as emission reduction targets tighten and other W/M provisions phase out, Arkansas jobs decline by 17,097 under the low cost case and by 23,284 under the high cost case. (Figure 12.) The primary cause of job losses is lower industrial output due to higher energy prices, the high cost of complying with required emissions cuts, and greater competition from overseas manufacturers with lower energy costs. Manufacturing employment is particularly vulnerable, under the Waxman/Markey bill. Table 7 shows the projected job losses by sector. Primary metals, chemical, fabricated metal products and machinery manufacturing suffer the largest job losses. (Job loss projections in Table 7 were based on the output losses from the earlier ACCF/NAM analysis so they are approximations rather than precise estimates.)

Even though W/M will create new “green” jobs due to the shift toward less carbon intensive fuels, more renewable energy, and increased expenditures for energy efficiency across all sectors of the economy, the overall result will be fewer jobs than under the baseline forecast. Since electricity produced by wind and solar power has to be backed up with conventional generating capacity, the impact of the W/M bill is to force the substitution of more expensive energy for cheaper fossil fuel energy. As a result, growth in productivity, GDP and employment is slowed.<sup>3</sup>

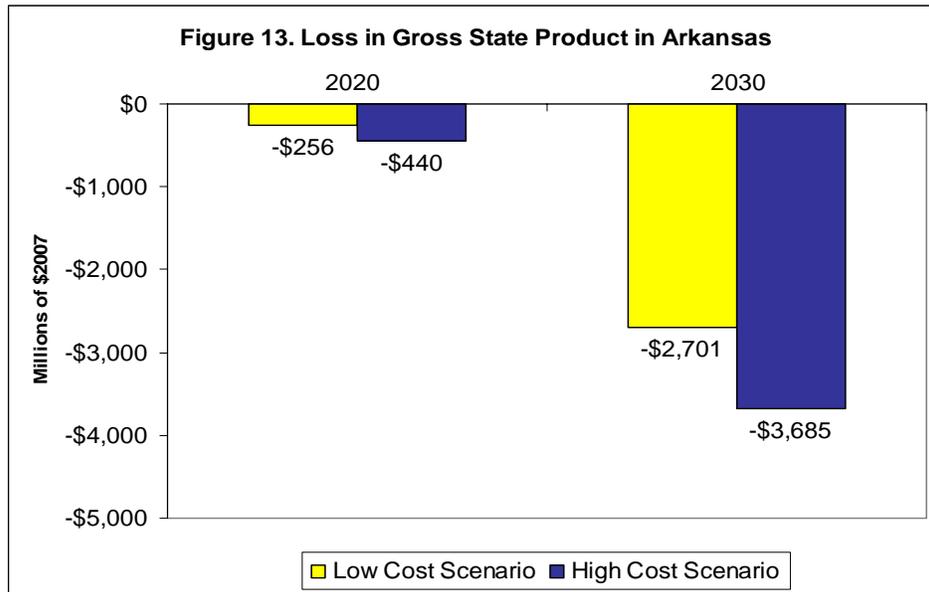
<sup>3</sup> For a critique of recent analyses which claim that the Waxman/Markey bill will generate millions of new jobs, including “green jobs,” see November 10, 2009 testimony before the U.S. Senate Finance Committee, see pages 4 and 7 at [http://www.accf.org/media/dynamic/3/media\\_395.pdf](http://www.accf.org/media/dynamic/3/media_395.pdf)



	Low Cost Case		High Cost Case	
	2020	2030	2020	2030
Total Employment Change in All Sectors	101	-17,097	-701	-23,284
<i>Major Manufacturing Sectors</i>				
Wood product manufacturing	-548	-965	-580	-1,052
Fabricated metal product manufacturing	-617	-1,064	-653	-1,272
Machinery manufacturing	-919	-1,070	-972	-1,313
Computer and electronic product manufacturing	-179	-269	-189	-320
Electrical equipment and appliance manufacturing	-512	-682	-544	-833
Motor vehicle, body, trailer, and parts manufacturing	-437	-744	-463	-802
Furniture and related product manufacturing	-178	-396	-184	-435
Miscellaneous manufacturing	-1	-33	1	-18
Food product manufacturing	-858	-1,004	-923	-1,128
Textile and textile product mills	-52	-80	-55	-89
Apparel manufacturing	-114	-148	-123	-172
Printing and related support activities	-14	-49	-14	-54
<i>Total</i>	-4,429	-6,505	-4,701	-7,488
<i>Energy Intensive Manufacturing</i>				
Nonmetallic mineral product manufacturing	-462	-856	-486	-925
Primary metal manufacturing	-1,058	-1,945	-1,119	-2,173
Paper manufacturing	-424	-782	-445	-854
Petroleum and coal products manufacturing	-43	-74	-44	-76
Chemical manufacturing	-365	-655	-384	-707
Plastics and rubber products manufacturing	-705	-1,385	-740	-1,509
<i>Total</i>	-3,056	-5,697	-3,218	-6,245

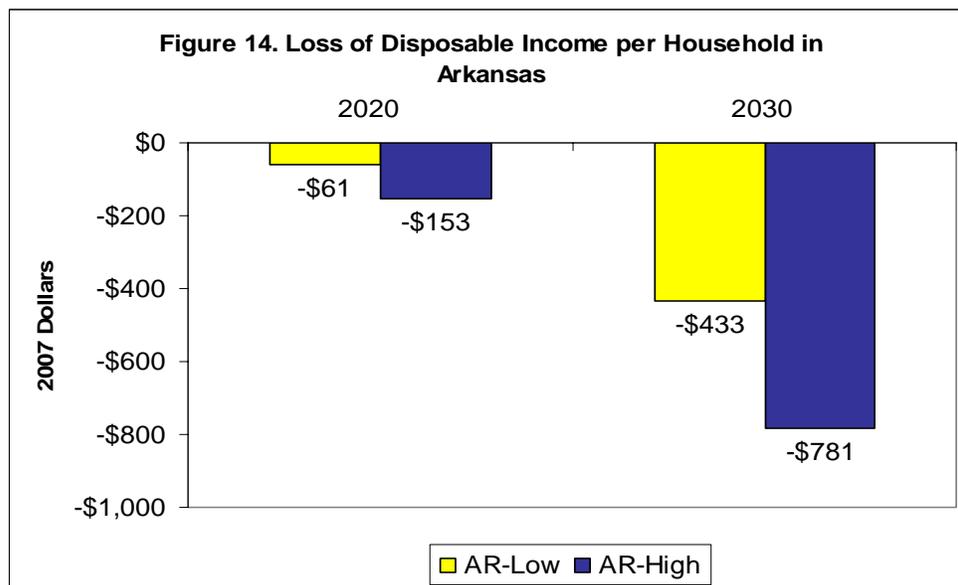
- **Impact on Economic Growth**

High energy prices, fewer jobs, and loss of industrial output are estimated to reduce Arkansas' gross state product (GSP) by between \$256 and \$440 million per year by 2020 and \$2,701 and \$3,685 million by 2030. (**Figure 13.**)



- **Impact on Disposable Income**

Higher energy prices would have ripple impacts on prices throughout the economy and would impose a financial cost on households. Arkansas would see disposable household income reduced by \$61 to \$153 per year by 2020 and \$433 to \$781 by 2030. (**Figure 14.**)



- **Impact on Low Income Families**

The impacts of W/M will be felt especially by the poor, who spend a greater share of their income on energy and other goods than other income brackets. By 2030, higher energy prices mean that low-income families in Arkansas (with average incomes of \$10,918) will spend between 22.8% and 24.0% of their income on energy under W/M compared to a projected 20.1% without W/M. Others on fixed incomes such as the elderly will also suffer disproportionately.

- **Impact on State Budgets**

The increases in Arkansas' energy costs under W/M will impact expenditures throughout the state. Specifically, Arkansas' 1,376 schools and universities and 110 hospitals will likely experience a 20.3% to 30.6% increase in energy expenditures by 2030. For government entities, costs for services, including public transportation and vehicle fleets, such as school buses, will also rise under W/M.

If Gross State Product declines by between \$2.7 and \$3.7 billion in 2030, state tax revenues will decline by about \$270 to \$370 million that year since states typically get about 10 cents of every dollar of income generated in the state. Such budgetary shortfalls could force hard choices on Arkansas policymakers.

## **Conclusions**

Arkansas has fared relatively well in the current recession compared to other states. If climate policy bills like Waxman/Markey (H.R. 2454 or Kerry/Boxer S.1733) are enacted, economic recovery from the current recession will be impeded as business and households face rising energy prices. In the longer term, Arkansas' real GSP, employment, industrial output, state budget revenues and household income will fall relative to the baseline forecast. Arkansas' manufacturing employment will decrease due to its energy intensity and the impact of higher energy prices on its competitiveness. As state policymakers consider legislation to reduce U.S. GHG emissions, they need to consider that the cost of reducing emissions through a cap and trade system like those currently being debated in Congress is likely to exert significant drag on the states' economy.