Analysis of

The Waxman-Markey Bill "The American Clean Energy and Security Act of 2009" (H.R. 2454)

Using

The National Energy Modeling System

(NEMS/ACCF-NAM 2)

A Report by the

American Council for Capital Formation

and the

National Association of Manufacturers

Analysis Conducted by

Science Applications International Corporation (SAIC)

ACCF

AMERICAN COUNCIL FOR CAPITAL FORMATION

NAM National Association of Manufacturers

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EXECUTIVE SUMMARY

Introduction:

The American Council for Capital Formation (ACCF)[1] and the National Association of Manufacturers (NAM)[2] contracted with Science Applications International Corporation (SAIC)[3] to analyze the Waxman-Markey bill, the American Clean Energy and Security Act of 2009 (H.R. 2454) to substantially reduce U.S. greenhouse gas (GHG) emissions over the 2012-2050 period. This study uses the NEMS/ACCF-NAM 2[4], the version used in this project 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 when asked by Congress and other federal agencies to analyze new energy and environmental policy initiatives. NEMS provides a common analytical tool for gaining valuable insights into the likely implications of alternative GHG reduction policy options. Using the model relied on by Congress also ensures that the discussion will focus on the merits of assumptions and policy choices rather than methodology. In the end, the use of the ACCF-NAM version of NEMS in this study supports and supplements congressional consideration of alternatives and enhances opportunities to identify commonalities, strengthen the legislation, and find solution paths. This study was performed by SAIC, independent of EIA.[5]

The ACCF and NAM believe it important to fully and realistically examine the potential costs that enactment of Waxman-Markey bill)[6] would impose on the U.S. economy. The Waxman-Markey bill requires an 83 percent reduction in CO2e compared to 2005 levels by the year 2050. It is well recognized that the cost to U.S. consumers and employers of implementing greenhouse gas (GHG) emission reductions is highly dependent on the market penetration achieved by key technologies and the availability of carbon offsets by 2030. Understanding the potential economic impacts at the national, state and individual household levels can help guide choices on climate change policy to minimize the impacts on economic growth and maximize the benefits to the environment. Greenhouse gas reduction policies need to include consideration of impacts on energy security, economic growth, and U.S. competitiveness. This project is designed to assist in this effort.

The ACCF-NAM analysis of the Waxman-Markey bill uses the most recent version of the EIA Annual Energy Outlook, the April AEO2009. This is the third version of the AEO released by EIA for 2009. The April AEO2009 includes the Stimulus Law enacted in February 2009, the American Recovery and Reinvestment Act of 2009 (ARRA), as well as the original Stimulus Law enacted in October 2008, the Energy Improvement and Extension Act of 2008. It also includes a new macroeconomic outlook that took into account the impact of the significant worsening of the ongoing recession that was not included in the earlier versions of the AEO2009.

In the near term, ARRA is projected to decrease the magnitude and duration of the current recession. Further out in the projection period, however, ARRA adversely affects macroeconomic performance as the larger budget deficits that result from the additional spending embedded in the stimulus package cause interest rates

1. The American Council for Capital Formation (ACCF) (www.accf.org) is a nonprofit, nonpartisan organization dedicated to the advocacy of tax and environmental policies that encourage saving and investment. The ACCF was founded in 1973 and is supported by the voluntary contributions of corporations, associations, foundations, and individuals. The mission of the ACCF is to promote economic growth through sound tax, environmental, and trade policies.
2. The National Association of Manufacturers (NAM) is the nation's largest industrial trade association, representing small and large manufacturers in every industrial sector and in all 50 states. Headquartered in Washington, D.C., the NAM has 11 additional offices across the country. Visit the NAM's award-winning web site at www.nam.org for more information about manufacturing and the economy.
3. SAIC is a FORTUNE 500® scientific, engineering and technology applications company that uses its deep domain knowledge to solve problems of vital importance to the nation and the world, in national security, energy and the environment, critical infrastructure, and health.
4. As noted, 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 last year in analyzing the Lieberman-Warner bill (S. 2191).
5. SAIC is a policy-neutral organization. SAIC executed the NEMS/ACCF-NAM 2 model in this project using SAIC's and ACCF/NAM's interpretation of the bill, and input assumptions provided by ACCF/NAM. The modeling was performed independent of EIA. Analysis provided in this report is based on the output from the NEMS/ACCF-NAM 2 model as a result of the ACCF/NAM input assumptions. The input assumptions, opinions and recommendations in this report are those of ACCF and NAM, and do not necessarily represent the views of SAIC.
6. The House of Representatives passed the H.R. 2454 on June 26, 2009 by a vote of 219-212.

to be higher and GDP growth to be lower. NEMS model changes reflect the following programs of ARRA 2009: weatherization, assisted housing, energy efficiency, and conservation block grants; State energy programs; Plug in hybrid and electric vehicle tax credits; tax credits for renewables; Loan guarantees for renewables, biofuels and transmission projects; support for CCS; and, smart grid expenditures.[7]

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. 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 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 (see Appendix a for assumptions).

Results of the ACCF-NAM Analysis of the Waxman-Markey Bill (H.R. 2454)

The NEMS/ACCF-NAM 2 model study's findings indicate substantial and growing impacts to consumers and the economy of meeting the increasingly stringent emission targets through 2030 established by H.R.2454. Among the NEMS/ACCF-NAM 2 study's general findings are:

• U.S. economic growth slows:

U.S. economic growth slows under the Waxman Markey bill (H.R. 2454), especially in the post 2020 period as the free emission allowances are phased out for both energy producers and energy consumers. In 2030, the inflation adjusted, annual GDP level is reduced by 1.8% (or $419 billion) under the low cost scenario and by 2.4% (or $571 billion) under the high cost scenario, compared to the baseline forecast (See Table 1 for results and baseline forecasts). To put these GDP losses in perspective, in 2008 the Federal government spent $612 billion on social security payments to retirees. Looked at another way, if GDP levels are reduced by $571 billion in 2030, Federal and State tax receipts will be approximately $170 billion lower that year since Federal and State governments take approximately 30 cents out of every dollar of GDP. Thus, government budgets will be harder to meet.

Over the entire 18 year period (2012-2030) covered by ACCF/NAM analysis, cumulative GDP losses are substantial, ranging from $2.2 trillion dollars under the low cost case to $3.1 trillion under the high cost case. Again, the hit to Federal and State budgets is large, cumulative tax receipts will be reduced by between $670 billion and $930 billion compared to the baseline forecast. Given the size of projected Federal deficits and State budget receipt shortfalls, policymakers may want to think carefully before imposing the Waxman Markey bill on the already struggling U.S. economy.

• Industrial production begins to decline:

Industrial production (manufacturing, mining and electric utilities) begins to decline immediately in 2012, relative to the baseline forecast, under the Waxman Markey bill. In 2030, U.S. industrial output levels are reduced by between 5.3 % and 6.5 % under the low and high cost scenarios. A hallmark of economic downturns and recessions is a slowdown in the growth rate or an absolute decline in the level of industrial output. Clearly, the negative impact on industrial output of the Waxman Markey bill would make it harder to keep the U.S. economy out of recession or sluggish growth insufficient to restore job growth.

• Employment is negatively impacted:

Employment is negatively impacted by Waxman Markey, even when additional "green" jobs are factored in. Over the 2012-2030 period, total U.S. employment averages between 420,000 and 610,000 fewer jobs each year under the low and high cost scenarios than under the baseline forecast. By 2030, there are between 1,790,000 and 2,440,000 fewer jobs in the overall

7. The details of the implementation are described in, "An Updated Annual Energy Outlook 2009 Reference Case Revisions Reflecting Provisions of the American Recovery and Reinvestment Act and Recent Changes in Economic Outlook," April 2009, Energy Information administration.

economy. Manufacturing employment is hard hit: in 2030 there are between 580,000 and 740,000 fewer jobs, or between a 6 and 7 percent reduction in total manufacturing employment in the U.S compared to the baseline forecast. On average, over the 2012-2030 period, the manufacturing sector absorbs 59 to 66 percent of the overall job losses caused by the Waxman Markey bill.

• Energy prices rise:

Energy prices rise over the 2012-2030 period, due to the various features of the Waxman Markey bill including prices for carbon permits which gradually rise to between $123 and $159 dollars per ton of CO2 by 2030 as well as the renewable portfolio standards, low carbon fuel standards, and energy efficiency standards. Over the past decade, each 1 percent increase in GDP in the U.S. has been accompanied by a 0.3 percent increase in energy use, thus higher energy prices will make it harder to recover from the current recession and to reduce the current high rate of unemployment. The ACCF/NAM study shows that residential electricity prices are 5 to 8 percent higher by 2020, by 2030 electricity prices are between 31 to 50 percent higher. Gasoline prices are also higher. By 2030 prices are up to 20 to 26 % higher than under the baseline forecast.

• Household income drops:

Household income drops under the Waxman Markey bill, even after accounting for rebates to consumers mandated in the bill. In 2030, the decline in annual household income ranges from $730 in the low cost case to about $1248 in the high cost case. However the impacts on household income in individual states, especially in the Midwest are more than 40 percent higher than the national average. For example, household income in Illinois is $1,096 lower in 2030 under the low cost case and $1,782 lower under the high cost case. Other Midwestern states, like Michigan, Indiana and Kansas show a similar pattern, income losses are much higher than the national average.

CONCLUSIONS

The ACCF/NAM analysis of the Waxman Markey bill shows that there are significant economic costs in terms of slower growth in jobs, household income and GDP from meeting the bill's GHG reduction targets. Given the wide recognition that without strong emission cuts in developing countries like China and India, U.S. emission reductions would have only negligible environmental benefits, policymakers should proceed cautiously as they develop climate change policies.

Table 1: Economic Impact of the Waxman-Markey Bill (H.R.2454) on the U.S. Economy

	Baseline (ACCF-Ref)			Low Cost Case (W/M)			High Cost Case (W/M)		
	2020	2025	2030	2020	2025	2030	2020	2025	2030
GDP (Billion 2007$)	$ 18,443	$ 21,016	$ 23,802	$ 18,403	$ 20,905	$ 23,384	$ 18,374	$ 20,853	$ 23,231
Loss in GDP (Billion 2007$)				$ 40	$ 112	$ 419	$ 68	$ 164	$ 571
% Loss				0.2%	0.5%	1.8%	0.4%	0.8%	2.4%
Employment (Millions)	157.2	160.7	165.8	157.2	160.4	164.0	157.1	160.2	163.4
Job Loss (Millions)				-0.01	0.33	1.79	0.08	0.52	2.44
% Loss				0.0%	0.2%	1.1%	0.0%	0.3%	1.5%
Industrial Output (Billion 2007$)	$ 7,962	$ 8,570	$ 8,839	$ 7,817	$ 8,305	$ 8,368	$ 7,790	$ 8,254	$ 8,263
Loss in Industrial Output (Billion 2007$)				$ 144	$ 265	$ 471	$ 172	$ 316	$ 575
% Loss				1.8%	3.1%	5.3%	2.2%	3.7%	6.5%
Coal Mining Output (Billion 2007$)	$ 27.4	$ 28.6	$ 29.2	$ 17.6	$ 12.9	$ 7.5	$ 17.0	$ 12.8	$ 7.0
Loss in Coal Mining Output (Billion 2007$)				$ 9.8	$ 15.7	$ 21.7	$ 10.4	$ 15.8	$ 22.2
% Loss				36%	55%	74%	38%	55%	76%
Primary Metals (Billion 2007$)	$ 188	$ 187	$ 164	$ 176	$ 166	$ 127	$ 171	$ 158	$ 116
Loss in Primary Metals Output (Billion 2007$)				$ 12	$ 21	$ 37	$ 17	$ 29	$ 48
% Loss				6%	11%	23%	9%	15%	29%
Carbon Allowance Price (2007$ / Ton CO2)				$ 47.50	$ 76.50	$ 123.21	$ 61.24	$ 98.63	$ 158.85
Average Household Income (2007$)	$ 98,929	$ 110,009	$ 121,731	$ 98,811	$ 109,670	$ 121,001	$ 98,679	$ 109,445	$ 120,483
Loss (2007$)				(118)	(339)	(730)	(250)	(564)	(1,248)
% Change				-0.1%	-0.3%	-0.6%	-0.3%	-0.5%	-1.0%
Energy Expenditures (Billion 2007$)	$ 1,480	$ 1,549	$ 1,682	$ 1,538	$ 1,652	$ 1,996	$ 1,584	$ 1,728	$ 2,136
Increase(2007$)				$ 57	$ 103	$ 313	$ 104	$ 179	$ 454
% change				3.9%	6.7%	18.6%	7.0%	11.6%	27.0%
Retail gasoline prices (2007 $/gallon)	$ 3.61	$ 3.69	$ 3.85	$ 3.92	$ 4.13	$ 4.62	$ 4.01	$ 4.28	$ 4.86
% Change				8.4%	12.1%	20.0%	11.1%	16.1%	26.1%
Residential Electricity Price (2007$ Cents/Kwh)	$ 11.10	$ 11.22	$ 11.69	$ 11.66	$ 11.77	$ 15.36	$ 11.98	$ 12.51	$ 17.54
% change				5.0%	4.9%	31.4%	7.9%	11.5%	50.0%
Industrial Electricity Prices (2007 Cents/Kwh	$ 6.45	$ 6.57	$ 6.91	$ 7.26	$ 7.78	$ 10.30	$ 7.84	$ 8.68	$ 12.17
% change				12.5%	18.4%	48.9%	21.5%	32.0%	76.0%
Residential Natural Gas Prices (2007$/Mcf)	$ 12.88	$ 12.93	$ 14.27	$ 12.46	$ 13.55	$ 22.31	$ 12.90	$ 14.24	$ 24.75
% change				-3.3%	4.8%	56.3%	0.1%	10.1%	73.5%
Industrial Natural Gas Prices (2007 $/Mcf)	$ 7.65	$ 7.62	$ 8.85	$ 10.19	$ 12.26	$ 16.55	$ 11.56	$ 14.19	$ 18.89
% change				33.3%	61.0%	87.1%	51.1%	86.3%	113.5%
Electric Utility Coal Prices (2007 $/Ton)	$ 38	$ 39	$ 40	$ 124	$ 180	$ 269	$ 151	$ 224	$ 345
% change				224%	359%	565%	295%	472%	755%
Manufacturing Employment (Millions)	12.0	11.6	10.1	11.8	11.2	9.5	11.7	11.1	9.4
Job Loss (Millions)				0.21	0.38	0.58	0.28	0.49	0.74
% Loss				1.8%	3.3%	5.8%	2.3%	4.2%	7.3%

appendix a: ACCF/ NAM Low and High Cost
CASE SPECIFICATIONS for Waxman Markey Analysis

	High Cost	Low Cost
Technology Build Constraints (2030 Build Limits)		
Nuclear	10 GW	25 GW
Igcc w sequestration	15 GW	30 GW
Biomass	Max 3 GW/Year	Max 5 GW/Year
Wind	Max 5 GW/Year	Max 10 GW/Year
NGCC w Sequestration	15 GW	30 GW
Technology total capital requirement (2007 $/kw)		
Nuclear	3,318	3,318
IGCC	2,378	2,378
NGCC	948	948
Supercritical PC	2,058	2,058
IGCC w SEQ	3,496	3,496
NGCC w SEQ	1,890	1,890
Wind - Onshore	1,923	1,923
Wind Offshore	3,851	3,851
Biomass	3,766	3,766
Other specifications		
Offsets(annual)	1,000 MMT (95% domestic, 5% international)	1,000 MMT (95% domestic, 5% international)
Oil price profile	AEO2009	AEO2009
Natural gas prices	Not Constrained	Not Constrained
Cellulosic ethanol	With HR6 - Not Constrained	With HR6 - Not Constrained
Banking	5,000 MMT	5,000 MMT
Hr6	YES	YES
Allowance prices (Annual growth)	Constrained to 10%	Constrained to 10%
Strategic Reserve	Not Modeled	Not Modeled