

# How Costly is Climate Change Mitigation? A Methodological Critique of the ACCF/NAM Claims

Julie A. Nelson, Global Development and Environment Institute, Tufts University\*

March 18, 2008

## Introduction

Now that the scientific evidence concerning global climate change is becoming irrefutable, opponents of climate change mitigation legislation are increasingly moving to economic arguments, claiming that such policy would be “bad for the economy.” The American Council for Capital Formation (ACCF), the National Association of Manufacturers (NAM), the U.S. Chamber of Commerce, and related industry groups have begun a campaign to convince the public that even modest climate change mitigation legislation will impose unbearably high costs on U.S. society (ACCF/NAM 2008a; U.S. Chamber of Commerce et al, 2008).<sup>1</sup>

ACCF and NAM have recently announced new national and state-level results from an extensive and complex model called NEMS/ACCF/NAM (ACCF/NAM, 2008). These results purport to show that the Lieberman-Warner Climate Security Act (S. 2191) would in a substantial way slow economic growth, decrease incomes, and cause job reductions. The analysis is, however, when evaluated against accepted standards of economic method, clearly both woefully incomplete and badly biased.

The first section of his paper briefly describes the EMS/ACCF/NAM model. The second explains how the campaign by ACCF/NAM fails as a guide to policy because of how it completely overlooks the benefits side of the standard policy evaluation process—that is, fails to take into account the costs of *inaction* on climate change. The third section examines how the model creates inflated estimates of energy costs and negative effects

---

\* 44 Teele Ave., Medford MA 02155 USA, [Julie.nelson@tufts.edu](mailto:Julie.nelson@tufts.edu), (617)627-6872

on production, due to unrealistic assumptions about efficiency gains and technology innovation. The result of these omissions and biases is a radically distorted portrayal of the effects of climate change mitigation policy on the economy, which is simply not credible.

### **The NEMS/ACCF/NAM Model**

The NEMS/ACCF/NAM model, run for the industry groups by Science Applications International Corporation (SAIC), uses the same basic National Energy Modeling System (NEMS) used by the U.S. Energy Information Administration (EIA). It is sometimes described as a “hybrid” model, in that it includes both a great deal of engineering detail about specific energy sectors, as well as economic components that evaluate prices and macroeconomic effects. While it includes proprietary components, it has been purchased and used by many groups outside of the EIA (EIA, 2008). The NEMS model is generally used to examine only the effects on U.S. industry and consumers of changes in factors such as fuel prices and energy standards, over a range of approximately 20 to 25 years into the future. The model is not well-suited for evaluation of benefits from climate change mitigation, particularly those that occur over a longer time frame.

The specific model called NEMS/ACCF/NAM incorporates not only the basic NEMS model, but also specific assumptions provided to SAIC by ACCF and NAM. According to the documentation provided by ACCF/NAM, they provided SAIC with “alternative input assumptions—different from those EIA will likely use in its analysis of S.2191” (ACCF/NAM, 2008, 5). These in particular include assumptions about “the likely availability of emissions reduction technologies, new energy sources and market mechanisms.” (ACCF/NAM, 2008, 5).

The importance of these assumptions can be noted by comparing the ACCF/NAM use of the model with runs made by other groups, under other assumptions. The Clean Air Task Force, for example, also using the NEMS model, estimates that S.2191 would—in stark contrast to the ACCF/NAM results--have “imperceptible” impacts on economic growth and employment over the next few decades, and *reduce* electricity bills to most residential and commercial consumers (CATF, 2008). Some of the differences in

assumptions will be discussed later in the paper; first, however, the more major flaw in the analysis must be addressed.

### **The Analysis Omits Consideration of the Costs of *Inaction***

The purpose of legislation such as S.2191 is, of course, to attempt to slow—and hopefully, eventually stop—the pace of global climate change, and so avert the widespread damages that are predicted to occur. These damages include more severe and more unpredictable weather events such as floods, droughts, and hurricanes; rising sea levels and the loss of costal landmass; increasing species extinction; disruptions in water supplies due to hydrological changes and loss of snow packs; and negative impacts on agriculture, especially tropical agriculture. Even with dramatic mitigation efforts, some of these damages will occur—and are already occurring; without strong mitigation efforts, even more catastrophic events, such as loss of the thermohaline current, may result.

The question of the costs of mitigation policy, then, cannot be analyzed in isolation from the question of benefits. The benefit to serious climate change mitigation efforts is, simply, a viable future (Ackerman 2008; Solomon et al. 2007). To *not* take action on climate means to destroy the global (relative) stability of weather patterns—along with many species and low-lying regions—simply to preserve and expand the level of conventional consumption by the present generation. It is relative to the possibly catastrophic consequences of *inaction*, that the costs of action should be evaluated--as one group of economists (including Nobel laureates) has put it, “The most expensive thing we can do is nothing” (Fisher et al. 2006).

The ACCF/NAM study is being presented as a full economic analysis or “cost benefit study” of S.2191 (Thorning, 2008). Yet, in fact, it studies *only* costs, and completely disregards benefits—forcing, by design, any policy with even the least amount of cost to appear to be a poor choice. Dr. Margo Thorning of the ACCF has attempted to justify this approach with the following two arguments: (1) Any benefits to the U.S. from domestic mitigation policy would be very small because increasing emissions from the rest of the world, especially China and India, will continue to warm the planet, and (2) The best way to combat climate change (and reach other goals, such as

health care) is to have a growing economy (i.e. an economy not slowed by mitigation efforts). These arguments are both spurious.

Regarding the first argument, climate change is a classic example of what economists call a “public good”--something that everyone can benefit from, whether they contribute or not, and from which no one can be excluded. Public goods, economic analysis shows, tend to be provided at inefficiently low levels by private decision-making alone. Were every nation to make its decisions regarding mitigation based on only the private (i.e., domestic) costs and benefits of doing so, without taking into account the benefits to be gained by a concerted global effort, *no* nation will take action. And then all nations would suffer the consequences. This situation can also be framed in game-theoretical terms, as a case in which private incentives lead to a “race to the bottom.”

Global climate change mitigation does require a global effort. At the present time, the U.S. is trailing all other industrialized nations in making this effort, and acting as what economists call a “free rider” on the efforts of others. Countries such as India and China will eventually need to be included in these efforts, it is true, but it is disingenuous in the extreme to insist that they take the lead, while the U.S. trails behind. Based on any evaluation of past responsibility for carbon accumulation in the atmosphere, or current ability to pay for mitigation, it is clearly that the reverse should be the case (Baer et al., 2007). And as a political matter, India and China simply will not agree to invest in mitigation efforts as long as the U.S. merely stands by.

The argument that more GDP growth is always better is a variant of what economists call the “environmental Kuznets curve” hypothesis. This is the idea that a healthy environment is a luxury good, so that the more income people in a country have, the more they will “spend” on environmental protection. The hypothesis has some limited empirical support across countries for some specific pollutants: Emissions of sulfur dioxide (the cause of acid rain), for example, tend to rise with per capita income up to certain level, and then decline. But there is no evidence that this relationship holds for greenhouse gas emissions, which tend to only rise with increases in per capita GDP.

For issues of climate change mitigation, it is not just the simple level but also the *composition* of GDP that it is important to track. Unfortunately, widespread use of simple GDP growth as a measure of the “health of the economy” has sometimes been

fostered even by economists. More sophisticated economic analysis, however, recognizes that GDP is a very crude measure that does not account for many things—most importantly, in the present case, for degradation of the natural resource base on which society depends. An economy that expands by depleting its environmental assets is no more economically “healthy” than an household that lives off borrowing on credit cards. Climate change mitigation policy is intended to shift the economy towards a low-carbon, more sustainable basis.

Implicitly, the ACCF/NAM analysis is also biased by a strong tilt towards the present generation and an overly-narrow set of comparison goals. Since many of the most severe damages from climate change will be felt by our children, grandchildren, and future generations, the framing of the policy choice as between present-day (costly) climate mitigation and present-day health care, or between mitigation and attention to the needs of low income families—as done in a number of the ACCF materials—is thus profoundly misleading. There are many things besides health care on which we currently spend, and many ways in which economic equity could be improved. Yet without serious efforts at mitigation, not only the health but the very survival of many people, and particularly of people with fewer resources to cope with climate change, is profoundly threatened.

### **The Analysis Overstates Costs**

The NEMS/ACCF/NAM model inflates its estimates of costs by ignoring available energy efficiency gains, by making exceedingly pessimistic assumptions about the development of technology, and by other means of exaggeration.

Their analysis assumes that economic agents are already optimizing—that is, already using all resources in the most efficient ways. This idea is often colloquially expressed by the phrase, “There are no dollar bills on the sidewalk.” That is, if there were some opportunity for an agent to save on costs or take some other action so as to reach a higher well-being or profit level than they currently reach, their model assumes that—being perfectly informed and perfectly rational—the agent will have already have taken advantage of it (i.e., picked up the dollar bill).

Empirical evidence contradicts this, particularly in the case of energy technologies. Activities by groups such as the American Council for an Energy Efficiency Economy and the audit program of the Department of Energy's Industrial Technology Program give evidence that there *are*, in fact, energy dollar bills on the sidewalk. A recent independent study by the McKinsey company, supported by major players among both energy companies and environmental groups, suggests "almost 40% of abatement" called for in recently proposed legislation in the United States "could be achieved at 'negative' marginal costs" (Creys et al. 2007). Some studies argue that environmental regulations can, by stimulating innovation, creating positive spillover effects among various activities, and overcoming organizational inertia, actually serve to maintain or improve overall business productivity and profitability (DeCanio, Dibble and Amir-Atefi 2001; Krause et al. 2002; Porter and van der Linde 1995). Such "no regrets" implementations of technologies and processes could make initial attempts at mitigation—far from being as costly as the ACCF/NAM analysis suggests—free, or even cost-saving. While the "no regrets" options are unlikely to be sufficient in themselves to get the economy all the way to sustainability, they will be very helpful in pushing it in the right direction.

In addition, the analysis downplays what many economists see as the primary advantage of market-based policies such as cap-and-trade: Carbon price increases will encourage technological innovations. Many other energy studies predict falling costs of energy-efficient and renewable technologies, as businesses innovate and "learn by doing" (see Repetto, 2008 for comparisons). The ACCF/NAM study, in contrast, projects unusually high prices for current and new technologies. As a result, the carbon price necessary to bring down emissions is forced to climb higher in the model, feeding inflation and generating predictions of economic slowdown. The benefits of a market-based, innovation-inspiring approach to mitigation—though highly trumpeted elsewhere by economists and business leaders—seem to be here entirely ignored.

The analysis drives up estimated costs in other ways, as well. ACCF/NAM assumes that none of the revenues from sales of allowances will be used to encourage research and development, encourage the deployment of new technologies, or ease the impact of changing energy prices on those least able to pay. They assume no banking of

allowances and no cap on allowance prices. The cost estimates are also presented in a way that exaggerates their importance. For example, they predict losses in GDP in the hundreds of billions per year by 2020. What they do not show is that, by their own analysis, this is only the equivalent to the loss of a few months of economic growth. Would people really believe that we should risk not doing anything about climate change, just so we can get to a level of GDP in the middle of 2020, that otherwise we would have reached by the end of the year?<sup>2</sup> The job “losses” predicted in their model are, similarly, not jobs that disappear, but small reductions in job *growth*.

Some industry groups, however, seem more interested in preserving the status quo than in exploring such possibilities. Historically, industry studies of pollution or health and safety regulations, for example, undertaken in protest of proposed legislation, have often predicted steep increases in production costs and sizeable layoffs of workers. The industry studies have often assumed a great deal of rigidity, such that the only options in the face of legislation would be to shut down the offending production processes or install costly current-generation technologies. Government-sponsored studies sometimes make similar assumptions, based on data provided to them by industry. Analysis of *actual* costs and layoffs *post*-regulation however, have frequently found such estimates of costs and job losses to be far overstated (Ackerman 2006; Goodstein 1999). The possibilities of revamping production processes, substituting among inputs, and innovating in technology have often led to far more flexible and cheaper responses than those forecast.

## Conclusion

The ACCF/NAM analysis fails as a guide to policy because it fails to take into account costs of *not* acting to mitigate climate change. It also fails by making assumptions about efficiency that are quite at odds with observed facts, and characterizing U.S. industry (and households) as rigid and unresponsive to price signals. The results of its model are presented in a manner designed to scare, rather than inform. They characterize as “bad for the economy” a policy direction that, in fact, many economists endorse (Stern, 2007; Fisher et al. 2006; Akerlof, et al. 2005; Redefining Progress, 1997).

It is odd, in many ways, that these industry groups should take an approach that so radically goes *against* the ideas that markets are powerful, that entrepreneurs respond to market conditions, and that American businesses are flexible and innovative. The ACCF/NAM-supported do-nothing approach, if sustained, would put U.S. businesses increasingly behind businesses in Europe and elsewhere, where price incentives are encouraging them to take the lead in innovation for a carbon-constrained world. As economists, we are most qualified to evaluate the ACCF/NAM study in terms of its methodological validity. But we cannot help but wonder whether it also truly reflects the interests of the organizations these industry groups claim to represent.

## References

- Akerlof, George et al., “United States Needs Incentive Based Policy to Reduce Carbon Emissions” [http://www.ucsusa.org/global\\_warming/solutions/economists-reduce-emissions.html](http://www.ucsusa.org/global_warming/solutions/economists-reduce-emissions.html)
- American Council for Capital Formation and the National Association of Manufacturers. 2008. “Analysis of The Lieberman-Warner Climate Security Act (S. 2191) Using The National Energy Modeling System (NEMS/ACCF/NAM)” <http://www.accf.org/pdf/NAM/fullstudy031208.pdf>
- Ackerman, Frank. 2006. "The Unbearable Lightness of Regulatory Costs." *Fordham Urban Law Journal* 33(4): 1071-1096.
- Ackerman, Frank. 2008 (forthcoming). *Can We Afford the Future?* London: Zed Books.
- Ackerman, Frank and Finlayson, Ian. 2006. "The Economics of Inaction on Climate Change: A Sensitivity Analysis." *Climate Policy* 6(5): 509-526.
- Baer, Paul, Athanasiou, Tom and Kartha, Sivan. 2007. "The Right to Development in a Climate Constrained World: The Greenhouse Development Rights Framework," *Ecoequity*.
- Clean Air Task Force. 2008. “The Lieberman-Warner Climate Security Act—S. 2191 A Summary of Modeling Results from the National Energy Modeling System.” [http://www.catf.us/publications/presentations/CATF\\_LWCSA\\_Short\\_Hill\\_Briefing\\_with\\_CAFE.pdf](http://www.catf.us/publications/presentations/CATF_LWCSA_Short_Hill_Briefing_with_CAFE.pdf)

- Creys, Jon, Derkach, Anton, Nyquist, Scott, Ostrowski, Ken and Stephenson, Jack. 2007. "Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?," McKinsey & Company.
- DeCanio, Stephen J., Dibble, Catherine and Amir-Atefi, Keyvan. 2001. "Organizational Structure and the Behavior of Firms: Implications for Integrated Assessment " *Climatic Change* 48(2-3): 487-514.
- Dorschner, John. 2008. "Utility Execs: Global Warming Fix Not That Pricey." *Miami Herald*, March 5.  
[http://www.miamiherald.com/news/breaking\\_news/story/445018.html](http://www.miamiherald.com/news/breaking_news/story/445018.html) (accessed 3/3/2008).
- Energy Information Administration, "The National Energy Modeling System: An Overview 2003," <http://www.eia.doe.gov/oiaf/aeo/overview/>
- Fisher, Anthony C., Goulder, Lawrence R., Antinori, Camille M., Arrow, Kenneth J. and 56 additional signatories. 2006. "The Most Expensive Thing We Can Do is Nothing: An Open Letter from California Economists."  
[http://calclimate.berkeley.edu/CA\\_Economists\\_Letter.pdf](http://calclimate.berkeley.edu/CA_Economists_Letter.pdf)
- Goodstein, Eban. 1999. *The Trade-Off Myth: Fact and Fiction about Jobs and the Environment*. Washington, D.C.: Island Press.
- Krause, Florentin, DeCanio, Stephen J., Hoerner, J. Andrew and Baer, Paul. 2002. "Cutting Carbon Emissions at a Profit (Part I): Opportunities for the United States." *Contemporary Economic Policy* 20(4): 339–365.
- Nelson, Julie A., Frank Ackerman, Neva Goodwin, Kristen Sheeran. 2008. "How Costly is Climate Change Mitigation? A Methodological Critique of the CRAI Modeling Approach." Working paper.  
<http://www.e3network.org/resources/HowCostlyMitigation2008.pdf>
- Porter, M.E. and van der Linde, C. 1995. "Green and Competitive: Breaking the Stalemate." *Harvard Business Review* 73: 120-134.
- Redefining Progress. 1997. "Economists' Statement on Climate Change."
- Repetto, Robert. 2008. "Reducing Carbon Emissions Could Help, Not Harm, U.S. Economy" <http://environment.yale.edu/news/5624-reducing-carbon-emissions-could-help-not/>

Solomon, S., D.Qin, Manning, M., Chen, Z., Marquis, M. et al., eds. 2007. *Summary for Policymakers*. Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.

Stern, Sir Nicholas. 2006. "Stern Review on the Economics of Climate Change," London: HM Treasury.

Thorning, Margo. 2008. "Economic Analysis of Climate Change Legislation." Presentation and responses to questions, Manchester NH, March 12.

U.S. Chamber of Commerce, National Association of Manufacturers, Alliance for Energy & Economic Growth, and the New Hampshire Motor Transport Association, 2008. "A Dialogue On Climate Change." Conference announcement, <http://www.yourenergyfuture.org/NewHampshireClimateChangeDialogue.pdf>. (accessed 3/7/2008).

---

<sup>1</sup> Until March 13, 2008, they used results from a model called MRN-NEEM, run for them by Charles River Associates International (CRAI). For a critique of this model by economists, see Nelson et al., 2008. For a critique by other leaders in the energy industry, see Dorschner, 2008.

<sup>2</sup> I do not have sufficient information about their model assumptions to make these statements precise at this time. However, this general pattern is true of all models that assume a substantial baseline economic growth rate, and then model deviations from it over a period of decades.