Prepared Statement of
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at a Hearing on
A Discussion Draft Entitled the "Energy Consumers Relief Act of 2013"
by the
Subcommittee on Energy and Power
Energy and Commerce Committee
United States House of Representatives
Washington, DC

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Mr. Chairman and Members of the Subcommittee:

Thank you for your invitation to participate in today's hearing. I am Anne E.

Smith, a Senior Vice President of NERA Economic Consulting. I have performed work

in the area of regulatory cost and economic impacts analysis over the past thirty years,

including as an economist in the USEPA's Office of Policy, Planning, and Evaluation, as

a consultant to the USEPA Air Office, and in many consulting engagements since then

for government and private sector clients globally. I have also served as a member of

several committees of the National Academy of Sciences focusing on risk-based decision

making. I received my Ph.D. in economics from Stanford University, including a Ph.D.

minor in the Engineering School's Engineering-Economic Systems Department. Over

the years, I have employed a wide variety economic and cost optimization models to

analyze costs and economic impacts of many U.S. energy and air policies, including fine

particulate matter ($PM_{2.5}$), regional haze, ozone, mercury, and climate policies. I have

also led project teams developing economic and cost models, including bottom-up system

cost models, electric sector market models, full-economy energy-economic systems

models, and computable general equilibrium models.

I thank you for the opportunity to share my perspective today on analysis of economic impacts of environmental regulations. My written and oral testimonies reflect my own opinions, and do not represent any position of my company, NERA Economic Consulting or of any of its clients.

Executive Summary

This hearing regards a discussion draft of a bill entitled the "Energy Consumers Relief Act of 2013." One of the requirements of this bill is that the EPA Administrator must submit a report to Congress containing estimates of the direct and indirect costs, energy price effects, and employment effects for any new energy-related rule out of EPA that is estimated to cost more than $1 billion. I recently conducted a review and evaluation of EPA's methods for estimating employment impacts in its Regulatory Impact Analyses (RIAs) for 57 separate air regulations released between 1997 and 2011. Some of my findings from that study are of relevance to this topic:

- Until 2011, EPA had an inconsistent record of providing employment impacts in its RIAs. The few RIAs that contained such estimates used a variety of methods (with no apparent pattern), that ranged from simple, single-sector models to full-economy general equilibrium estimates.

- EPA's RIAs for major air rules released since 2010 have more consistently provided employment impact estimates. However, these have been calculated using an inappropriately simplistic formula that is not

even on a par with the estimates that EPA was providing in its RIAs before 2005.

- The employment impact estimation formula that EPA has been employing since 2010 is guaranteed (by design) to estimate that each new regulation will result in an increase in jobs. This formula generates the illogical result that the higher the estimated direct cost of compliance, the greater will be EPA's projected job increase.

- Most of the regulations to which EPA has applied this inappropriate formula are the very types of rules that may have product price effects that can cause negative economic impacts, including employment impacts, to ripple through many other sectors of the economy. A full-economy analysis (such as EPA has used in the past) should have been employed instead.

- When the direct costs that EPA has estimated for several of its 2011 air regulations are reanalyzed using a full-economy model, negative impacts on worker earnings are consistently projected, rather than the positive job increases that have been reported in EPA's RIAs for those rules.

I further explain the above points in the remainder of this written statement. I attach a full copy of my report for the record, which contains more discussion and explanation of the issues than I cover in this statement.

Summary of Employment Impacts Methods in EPA RIAs from 1997 through 2011.

Under Executive Orders (EOs) of the President dating back to 1981, regulatory agencies have had to submit Regulatory Impact Analyses (RIAs) to the Office of Management and Budget for all their new regulations estimated to cost more than $100 million per year. Such RIAs must contain estimates of costs and benefits of the rule, but sometimes have also reported estimates of employment impacts.

EPA only intermittently provided quantitative estimates of employment impacts in its RIAs during the period 1997-2010, with such estimates being provided in only 23% (11 of 48) of the air RIAs in that period. There was no apparent pattern to explain which RIAs would have such estimates. There was no single method or approach employed either. Methods ranged from very simplistic partial analyses that addressed employment only in the specific industries being regulated, to full-economy methods that considered how price effects on products of the regulated sectors would ripple through the rest of the economy, as the purchasers of the regulated entities' goods or services face higher costs for some of their inputs.

A comprehensive full-economy approach was used in two RIAs that were released in 2005: for the Clean Air Visibility Rule (CAVR) and the Clean Air Interstate Rule (CAIR). Both of those rules affected energy-related sectors. By using a modeling method called "computable general equilibrium" (CGE), it was possible to assess how those regulations' effects on the price of energy (particularly of electricity) would impact other sectors that were not directly subject to any compliance requirements. This was an appropriate methodology to employ for those regulations. However, the review also

found that EPA has not consistently applied such full-economy analysis to several other major energy-related regulations where it would have been even more appropriate to do so.

Starting in 2011, employment impacts were more routinely provided in air RIAs. 78% (7 of 9) RIAs released in 2011 contained employment impact estimates. This sudden shift is probably a result of EO 13563 issued by President Barack Obama in January 2011. EO 13563, which provided supplemental information on the requirements of RIAs, was the first to specifically mention "job creation" as an effect of interest associated with the U.S. regulatory system.

Although EPA started to more routinely include estimates of employment impacts in air RIAs after issuance of EO 13563, EPA also started to use a highly simplistic job impact formula that is less credible or appropriate than even the partial analysis methods that were employed in RIAs during the period 1997-2004. The post-2010 set of employment impact estimates appears at first glance to be based on a quite sophisticated econometric method, but a closer inspection reveals that the estimates are derived using a simple multiplier. One cannot characterize the current formula favored by EPA as an economic methodology at all.

Description of Employment Impact Estimation Method Used by EPA Since 2010

The source for the jobs multiplier that EPA has been using in RIAs since 2010 is an econometric study reported in a 2002 paper by Morgenstern, Pizer and Shih, which I

will call "MPS."[1] The original study considers changes in the total payments to workers

in four different industries: pulp and paper, plastics, petroleum, and steel. The analysis

uses data from 1979-1981, 1985, 1988, and 1991. MPS splits the effect of regulation on

industry labor demand into three elements and estimates them all econometrically. The

elements are changes in payments to labor due to (i) change in the quantity of output

demanded ("the demand effect"), (ii) change in the cost of inputs, holding output and

technology fixed ("the cost effect"), and (iii) change in the mix of factors, such as

shifting from a dirty to a clean fuel ("the factor-shift effect"). The MPS paper also

provides an aggregate estimate of the combined effect of these three market/production

phenomena. Net effects on labor spending were found to be positive in three sectors

(plastics, petroleum, and steel) and negative in one (pulp and paper).

The entire theoretical formulation and associated econometric analysis in MPS is

based on data on total payments to workers. No measure of actual "numbers of jobs"

exists in the MPS paper. Once the econometric estimation of labor payments is

completed, MPS assumes one "job" is implied by a change in spending on labor of

$35,000 ($1987) to produce a summary result that allows labor spending across the four

sectors to be compared to each other. [2] This summary result varies from -1.13 to 6.90

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[1] RD Morgenstern, WA Pizer, JS Shih. 2002. "Jobs Versus the Environment: An Industry-Level Perspective." *Journal of Environmental Economics and Management*. 43(3): 412-436.

[2] This conversion in MPS from labor payments (the data analyzed) to "jobs" means that any estimates based on the MPS paper are actually "job-equivalents" (*i.e.,* the equivalent number of jobs that would exist if every person in the sector is paid the same average annual salary), and not numbers of actual employed individuals. The total number of employed individuals could decrease even as job-equivalents rises if the new types of labor required after the regulation is for more skilled, higher-paid types of employees.

"jobs" per million (1987$) dollars of compliance spending across the four sectors.[3] MPS also calculates an "average" effect, by weighting the four sectors' impacts based on the amount each sector was spending on compliance in the sample period (1979-1991). The appropriateness of this single average estimate is questionable, but at best it is an average over the four sectors and not an economy-wide average. It is 1.55 "jobs" per million (1987$) dollars of compliance spending. It is not statistically significant, meaning that it cannot be said to be different from zero, or no net impact on aggregate labor payments across the four sectors.

It is this single estimate of 1.55 "jobs" per million (1987$) dollars of regulatory cost that EPA has now adopted as a simplistic *multiplier* to apply to the cost of new regulations that it is analyzing in its recent air RIAs. All that EPA does in each RIA is take its estimate of the direct cost of compliance to the regulated sector, restate that cost estimate in 1987$, and multiply it by 1.55. The result is then reported as the "job impact" of that regulation. The fallacy of this formula should be apparent to anyone. Since the multiplier is always +1.55, no matter what the cost, period of time, or industry subject to the regulation, EPA's simplistic method will always conclude that the new regulation will create jobs. Further, the more costly the regulation, the *greater* the job increase that it will project. This effect can be clearly seen in Figure 1 below, taken from my report. The figure graphs the estimated cost of each regulation for which EPA has produced an MPS-based job impact estimate on the vertical axis against the estimated number of jobs

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[3] Morgenstern, Pizer and Shih (2002), Table III, p. 427.

created on the horizontal axis. The dots for each regulation fall on a line: the more

costly the regulation, the more positive the estimated job impacts.[4]

Figure 1. Relationship between EPA's Estimates of a Rule's Compliance Costs and its Job Impacts for Air RIAs that Used MPS-Based Formula
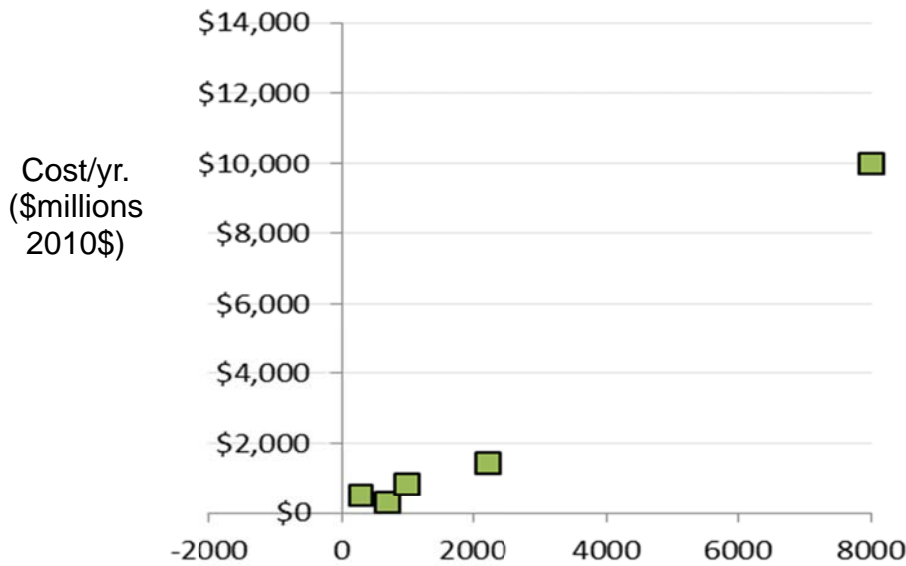
The MPS paper's econometric methods are complex, but EPA's use of its

summary result as a multiplier to project impacts of future new regulations is simplistic.

It has no methodological merit even for use with relatively low-cost regulations that may

have little indirect effect on the rest of the economy. The MPS-based multiplier is for

changes in total labor payments, not numbers of employees, as EPA's RIA imply. It is an

estimate of how total labor payments changed as a result of past environmental spending

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[4] In fact, the slope of the line would be 1.55 per million dollars of regulatory cost, if costs were stated in 1987$. However, this graph states the cost estimates in 2010$).

not linked to any individual type of regulation. It is an aggregate of four specific sectors, none of which was electricity generation.

The Need for Full-Economy Impacts Estimates in Place of EPA's Method

Of even more concern, however, MPS was a *partial* employment impact study, meaning it only considered labor spending *by the sectors that absorbed the compliance spending directly.* The MPS study was not designed to address the question of the full-economy effects of regulations. When a regulation's cost may be passed through to the regulated sector's customers, regulatory impacts can ripple through the full economy. This is a significant concern for regulations that may raise the prices of commodities that are widely used throughout all sectors of the economy, such as electricity and fuels.

This is not an idle concern. In Figure 1, the data point in the far upper right corner (*i.e.,* with the highest cost and, according to EPA, the largest job-increasing effect) represents the electric generating unit Mercury and Air Toxics Standard (MATS) that was promulgated in December 2011. This rule directly affects the cost of generating electricity, and it is has the second highest cost of all the air regulations in the set of air RIAs reviewed.[5] The electricity sector was not among the sectors analyzed in the original MPS study. But more importantly, the MATS rule has all of the attributes that would indicate the appropriateness of a full-economy analysis. EPA estimates MATS to have a direct cost that will be 2.5 to 15 times higher than EPA's cost estimates for CAIR and CAVR, respectively, which were the two rules that EPA subjected to full-economy

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[5] The highest cost estimate was for the 1997 $PM_{2.5}$ and Ozone NAAQS ruling – another regulation that affects energy sector costs, for which EPA also did not apply a full-economy impact analysis.

analysis in 2005. EPA continues to maintain the CGE model, EMPAX-CGE, that it used

in its 2005 RIAs for CAIR and CAVR.[6] There is no good reason to have applied the

MPS-based multiplier to MATS.

Other regulations to which EPA has applied the MPS formula include the Cross-

State Air Pollution Rule (CSAPR), the Industrial, Commercial and Institutional Boilers

NESHAP, the Portland Cement NSPS and NESHAP, and the Industrial Solid Waste

Incineration Units NSPS. None of these are among the sectors that were analyzed in the

MPS econometric study, either. Although not as costly as MATS, all of these rules were

estimated by EPA to have annualized costs exceeding $250 million/year. Most of these

rules could affect prices of a wide range of inputs to other sectors and to consumers.

Again, these are conditions that would indicate need for a full-economy analysis

approach. (They are also the conditions under which the MPS-based approach would be

least appropriate.)

In my recent study, I developed full-economy estimates of the impacts of several

of the regulations that were among the air RIAs reviewed: for the MATS rule, the

Industrial, Commercial and Institutional Boilers NESHAP, CSAPR, and an illustrative

analysis of a 65 ppb Ozone NAAQS.[7] These estimates were developed using a CGE

model of the U.S. economy called N_{ew}ERA. Model runs were conducted using the same

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[6] Indeed, EPA used EMPAX-CGE for its Second Prospective Analysis of the Benefits and Costs of the
Clean Air Act from 1990-2020, released in March 2011.

[7] The costs for the illustrative 65 ppb Ozone NAAQS were based on the incremental cost of a 65 ppb
standard relative to the 75 ppb standard that was selected in 2008, using the cost data in the 2008 RIA.
It is illustrative because EPA did not actually select that standard in its 2008 rulemaking, and our
analysis treats those incremental costs as occurring in the future, as might occur if 65 ppb is the
standard selected as a result of the ozone NAAQS review that is expected to be finalized in 2014.

assumptions about direct costs that were provided in the RIAs. It should be noted that the

CGE model is a full-employment model that does not estimate short-term, involuntary

transitional unemployment. Instead, impacts to employment are captured in the form of

changes in the average real wage rate, and in voluntary changes in labor supplied, given

the scenario's wage rate (also known as labor force participation). The combined effect

of the two is a change in total payments to labor. This change can be stated in "job-

equivalents," which is simply the total labor earnings change divided by the average

annual salary of one worker. Job-equivalent estimates indicate how many jobs would be

eliminated *if all of the reduction in labor payments were imposed as a 100% loss of wage

income for certain individuals*. The long-term reality is more likely to be a small change

in income spread over a much larger number of individuals, and so a job-equivalent

estimate should not be viewed as a projection of numbers of lay-offs or swelling of the

unemployment rolls. It is, nevertheless, an indicator of the magnitude and direction of

impact on worker incomes. (As I pointed out above, the MPS estimate also is a job-

equivalent estimate, and not an estimate of changes in numbers of people holding jobs.)

Table 1 summarizes the results of these analyses. In brief, a full-economy

analysis consistently finds net negative impacts on worker incomes for each regulation.

A large portion of these negative impacts are projected to occur in sectors that bear no

direct compliance cost or regulatory burden. For example, the commercial and services

sectors account for the majority of the labor income reductions, even though these rules

impose little or no direct compliance obligation on them.[8] These labor effects result from

the reduced productivity of the overall economy that comes from diverting economic

resources towards compliance spending, which ultimately comes at the expense of

financially-productive investments. It appears that regulations affecting the electric

sector have a larger impact outside of the regulated sector than do non-energy

regulations. This may be because of the more widespread impact of changes in prices of

electricity than of other types of commodities. Further analysis is needed to check the

latter hypothesis. However, the overall implications of these reanalyses is clear: a full-

economy analysis is needed to properly understand the economic implications of

regulations that have costs nearing or exceeding $1 billion per year.

Table 1. EPA's MPS-Based Job Estimates Compared to Those from a Full-Economy Analysis

Rule	Sectors Subject to Rule	Direct Costs of Rule (summarized in annualized form, stated in 2010$)	Estimated Change in Job-Equivalents	
			EPA (MPS-Based)	Full-Economy (CGE-Based)
MATS [(*)]	Electricity	$10.4 billion	+8,000 (-15,000 to 30,000)	-71,000
CSAPR	Electricity	$0.5 billion	+700 (-1,000 to 3,000)	-34,000
Industrial Boiler MACT	Most industry other than ELE	$2.4 billion	+2,200 (-4,100 to 8,500)	-28,000
Illustrative 65 ppb Ozone NAAQS [(**)]	All sectors + households	$26.5 billion	No estimate in EPA's 2008 RIA	-609,000

(*) MATS impact analysis was performed relative to baseline with CSAPR, as in RIA. The other three policies were analyzed relative to a baseline with CAIR, for comparability to EPA's RIAs for those 3 rules.
(**) Based on incremental cost of 65 ppb relative to 75 ppb as estimated in 2008 Ozone NAAQS RIA, with 65 ppb NAAQS assumed to be promulgated in 2014.

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[8] See the addendum to the full report the I submit with this statement for more details of how the total reduction in job-equivalents is distributed among all the sectors of the economy.

Need for a Broader Understanding of Employment Impacts

The statement above has been focused on a few key issues about the technical issues with EPA's methods of making employment impacts estimates. I will close with two broader observations.

First, even using best practices for estimating impacts of an individual regulation, the current practice of estimating the impacts of regulations on a rule-by-rule basis is likely to lead to a misunderstanding of the degree to which regulations are affecting the overall productivity and growth potential of our economy. With each new regulation, the costs of all existing regulations are swept into the baseline, and thus are effectively treated as having no cost at all. Attention therefore should also be directed to the cumulative impacts of the entire suite of regulations that an economy is absorbing over time. Cumulative impact studies are occasionally performed, but perhaps not often enough, and not broadly enough.[9]

Second, it is important to recognize that "employment impact" is a much broader and more complex phenomenon than "numbers of jobs," or even of "job-equivalents." Even if an estimate is based on a full-economy analysis, policymakers and the public cannot be expected to gain much insight about a regulation's impacts on employment when they are provided only estimates of numbers of "jobs affected." This is a misleadingly simplistic metric that does not begin to reflect the true issues and concerns

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[9] For example, EPA occasionally prepares a report on the total costs of the Clean Air Act (required under Section 812 of the Clean Air Act), but this does not include all environmental regulations, nor any of the many non-environmental regulations that impose costs on the productive sectors of our economy.

that regulations pose for employment opportunity. Some of the important concerns that simplistic "jobs" estimates fail to address include:

- Whether the impact is to reduce the wage rate that would otherwise be earned by workers, to change the number of hours of work per week, or literally to eliminate job openings.

- Whether the impact will come in the form of layoffs, or via reduced growth in new job positions.

- Whether new employment opportunities created by the regulation will call upon the same sets of skills and education as the employment opportunities ended by the regulation.

- Whether wage rates for lost hours of work are greater or less than wage rates for hours of work gained – in other words, whether lower paying jobs are replaced with higher paying jobs, or vice versa.

- In the case of an economy with current underemployment:
  - Whether the new employment opportunities match the skills and capabilities of those who are in need of work, or simply increase the demand for individuals with skills not greatly affected by the downturn.
  - Whether the change in employment opportunities is expected to occur during or after the anticipated end of the downturn.

- Whether the projected employment impacts would be of short duration (as in the case of transition to a new equilibrium) or permanent (as in the case of reduced productivity of the economy).

More work needs to be done to develop methods for estimating and characterizing the above additional aspects of employment impacts, while striving for more credible and appropriate methodologies to replace those that are currently most frequently used by EPA in its air RIAs.