EJW
ECON JOURNAL WATCH
Scholarly Comments on
Academic Economics

ECON JOURNAL WATCH 14(1)
January 2017: 103–120

Propagandistic Research and the U.S. Department of Energy: Energy Efficiency in Ordinary Life and Renewables in Electricity Production

Daniel Sutter[1]

LINK TO ABSTRACT

I treat two cases of what I believe can be characterized as research propaganda attributable to the U.S. Department of Energy (DOE). The first concerns the extent to which Americans are mindful of energy efficiency in their cars, appliances, homes, and machinery, and the second concerns the mandating of the use of renewable fuels in electricity production. I contend that the DOE-based research is unsound and that the unsoundness amounts to propaganda. The DOE should bear material responsibility for its research, its dissemination of research, and its influence over the research of others.

Energy efficiency in the ordinary lives of Americans

Are Americans mindful of energy efficiency in using their automobiles, lawn mowers, and appliances? The received wisdom of many energy policy experts is 'no,' a proposition which has been dubbed the 'energy paradox' or 'energy efficiency paradox' (or 'gap'). American households and businesses allegedly pass up

1. Troy University, Troy, AL 36082.

billions of dollars of cost savings by ignoring some of the cost of using products. On this matter the DOE has helped create and perpetrate major distortions of the truth.

The so-called energy efficiency paradox has had an enormous impact on public policy. The Energy Policy and Conservation Act of 1975 authorizes the establishment and periodic updating of energy conservation standards for residential and commercial products. Energy efficiency standards restrict freedom of choice by households and businesses as follows. Standards for minimum efficiency in energy use are set through the standard rulemaking process, supposed to be "technically feasible and economically justified," and reviewed by the DOE every six years (**link**). Once a standard is set, appliance manufacturers must submit evidence from testing that each model they wish to sell in the U.S. meets the standard.[2] The DOE establishes protocols for the tests that manufacturers are supposed to conduct to demonstrate compliance with the standards; these protocols also govern the information used to report annual energy cost for Energy Guide labels. The DOE is supposed to follow these same protocols when it conducts any product tests. Models for which manufacturers cannot submit test data showing compliance cannot be sold in the U.S. The DOE generally accepts the authenticity of data submitted by manufacturers from tests following the protocols and does not generally conduct its own tests or require third-party testing. The DOE conducts its own tests if it receives complaints about a particular model of appliance. If DOE testing reveals that a model does not meet the standards, the product must be pulled from the market and the manufacturer is subject to prosecution.

The DOE has aggressively strengthened these standards in recent years; 44 new or updated standards have been issued since 2009. Documents from the DOE tout enormous savings: "Today, a typical household saves about $319 per year off their energy bills as a result of standards, and as people replace their appliances with newer models, they can expect to save over $460 annually by 2030. … The cumulative utility bill savings to consumers are estimated to be more than $1 trillion by 2020 and grow to nearly $2 trillion through 2030." The DOE estimates that just one new standard, for commercial air conditioners and heat pumps, will save businesses $167 billion in total (DOE 2016a). And energy efficiency offers the promise of further gains, as emphasized by a DOE-sponsored report by McKinsey & Company: "Energy efficiency offers a vast, low-cost energy resource for the U.S. economy—but only if the nation can craft a comprehensive and innovative approach to unlock it. … Such a program is estimated to reduce end-use energy consumption in 2020 by 9.1 quadrillion BTUs, roughly 23 percent of projected

2. Information about the Appliance and Equipment Standards Program is available via energy.gov (**link**).

demand, potentially abating up to 1.1 gigatons of greenhouse gases annually" (Granade et al. 2009, iii). A meta-analysis of engineering studies found that the potential energy savings could be as much as 60 percent (Rosenfeld et al. 1993).

The efficiency standards take less energy-efficient models off of the market. If households and businesses reasonably evaluate the tradeoff between energy use, price, and other product features, then restricting consumer choice, by taking options off the market, imposes costs on consumers. The energy efficiency paradox is required to provide an argument that restricting choice makes consumers better off. As the DOE puts it, "These solutions [standards] result in energy bill savings for consumers as the least-efficient product models become ineligible for sale in the United States" (2016a). What in the past would have been considered costs have been transformed into a new type of benefit of regulation, what have been called "private benefits" (Beaulier and Sutter 2012).

An energy efficiency 'paradox' result arises in two types of stories, or in a combination thereof. One story is that the price of energy might not reflect externalities, such as pollution, national defense spending to safeguard the energy supply, or subsidies or tax breaks in energy production. I do not treat the externality story. The other story is that, from a lack of prudence, people systematically under-exploit opportunities for energy efficiency.[3] I do not treat the externality story here, for two reasons. First, the inefficiency possibly resulting from externalities is conceptually distinct from that alleged to result from poor decisions. Consequently the validity of the externalities attributed to energy use is distinct from the propagandistic argument regarding decisionmaking. Second, the external benefits of recent energy efficiency regulations have been small relative to the private benefits. For instance, Ted Gayer and Kip Viscusi (2013, 252) note that externalities total around 10 percent of the estimated benefits for the 2017–2025 model year fuel economy requirements for cars and light trucks. Sofie Miller (2015) calculates that private benefits constituted 88 percent of the quantified annual benefits of 25 DOE energy efficiency rules issued between 2007 and 2014.

The proposition that Americans systematically under-exploit opportunities has not, in my judgment, been established. Gayer and Viscusi argue that "There are a number of alternative reasons that can explain a purported energy efficiency gap, many of which are consistent with individual rationality." They also say that "the evidence in the economics literature on the existence and magnitude of such an energy efficiency gap is mixed and does not provide a compelling justification for

3. Allcott and Greenstone (2012) offer another story: Builders or landlords make decisions about building energy conservation into structures and fail to offer energy efficient options to homebuyers or renters, perhaps because they believe customers will not be willing to pay extra for conservation. Consumers then cannot register a preference for energy efficiency.

overriding consumer decisions" (2013, 249). They conclude, "Taken as a whole, the engineering, empirical, and behavioral literature on the energy-efficiency gap does not provide strong, credible evidence of persistent consumer irrationality" (ibid., 250). Hunt Allcott and Michael Greenstone write that the literature demonstrating inefficiencies with regard to energy efficiency investments "frequently does not meet modern standards for credibility," and "the empirical magnitudes of the investment inefficiencies appear to be smaller, and indeed substantially smaller, than the massive potential savings calculated in engineering studies" (2012, 5).

Energy efficiency investments involve households or businesses incurring upfront costs in exchange for lower energy costs over time. Allcott and Greenstone (2012) offer an overview of this decision problem (see also Jaffe and Stavins 1994). The key variables will be the estimated lifetime energy cost savings, which can be broken down into the reduction in energy use and the energy prices expected over the period of the investment, the discount rate, and the cost of investment. The cost of the investment includes the differential in the upfront expense and other 'costs' of the investment including transaction costs and reduced performance and enjoyment. Studies will often demonstrate an energy efficiency paradox by calculating the discount rate at which a decisionmaker would be indifferent about making the investment in energy efficiency, with a decision to not invest revealing application of a discount rate in excess of this threshold. If the threshold discount rate is too high, say because it exceeds the rate of interest which the decisionmaker faces in the market, the decision is 'irrational.' Allcott and Greenstone note that the opportunity cost term is generally unobservable and note that "in order to argue that an agent is not maximizing an objective function, the analyst must credibly observe that function in full" (2012, 5).

Engineering analysis is typically employed by DOE in assessing the potential energy savings. As illustrated by the Technical Support Document for one recent proposed regulation on residential dishwashers (DOE 2014), assumptions must be made about: the technology available to make a product using less energy; manufacturer cost of producing a product with this technology; how performance characteristics reduce energy (and water) use; retail markups based on the added costs; use by households (the number of cycles per year for a dishwasher); choice of a discount rate; expected useful life; and any added maintenance costs. Furthermore, even if not made explicit, assumptions must also be made about the costs to users of apprehending, comprehending, and implementing a new, more energy-efficient product. The Technical Support Document for this one proposed regulation runs to 489 pages, reflecting the detail of the analysis.

Nonetheless, energy efficiency investments often fail to deliver the promised savings. Heterogeneity provides an important reason why. Miller (2012) shows, using the DOE's own assumptions, that households with fewer persons—which include on average households headed by the elderly and low income earners—run fewer dishwasher cycles per year and would never recoup the higher upfront costs of the more efficient models. Differences across businesses can be even greater. Ronald Sutherland (1991) found that energy savings predicted by engineers in commercial building retrofits frequently differed by 20 percent or more from realized savings, reflecting the importance of particular circumstances. Managers' reluctance to make any given investment could easily result from a better recognition of their particular circumstances.

Other studies suggest that projected energy savings are systematically overstated. A study by Proctor Engineering Group claimed a prospective 50 percent rate of return on attic-insulation investments, but Gilbert Metcalf and Kevin Hassett (1999) estimated a 9.7 percent rate of return. Metcalf and Hassett note that engineering studies "misrepresent savings because they are based on highly controlled studies that do not directly apply to actualized savings in a representative house" (ibid., 516), and furthermore that the engineering studies are sometimes provided by the makers of the products, raising questions of credibility. Other studies also document disappointing results (e.g., Fowlie, Greenstone and Wolfram 2015b).

Transactions costs are an unavoidable challenge to credibly communicating information. Assuming the costless transmission of true (and only true) product quality claims commits the Nirvana fallacy that Harold Demsetz (1969) warned against. Consequently, difficulty conveying knowledge of energy savings is not necessarily a market failure, as those who posit an energy efficiency gap presume. It is a hardy fact that households and businesses are unwilling to trust unverified and frequently overstated energy efficiency claims, a fact that must be incorporated into cost-benefit analysis.

The credibility challenge can be seen in the federal government's effort at certifying energy efficiency, the Energy Star program. Energy Star is a voluntary certification program run jointly by the DOE and the Environmental Protection Agency. The program is intended to provide consumers a "trusted source of unbiased information" regarding the most energy efficient products on the market (EPA IG 2010, 2). In principle, as Viscusi and Gayer (2016) argue, information provision is a targeted and noncoercive way for the public sector to address decisionmaking biases. Energy Star certification and Energy Guide labels provide consumers with information about estimated energy use and should provide an antidote to myopia. The information in the certification and labels, however, must be perceived to be credible. Numerous government reports have documented Energy Star's considerable design flaws (GAO 2007; 2010; 2011; DOE IG 2009; EPA IG 2010). One GAO report (2010) documented the weakness of the Energy Star certification process by submitting 20 bogus products for certification. Fifteen of the products received Energy Star certification, with three still pending review at the conclusion of the test; only two were rejected. Until recent reforms, Energy Star never relied on independent, third-party testing, which is the core of successful private quality-certification programs (see Holcombe 1997). Rather, the DOE presumes that the manufacturers' documentation is valid and relies on competitors to challenge the authenticity of bogus claims (GAO 2010).[4] The EPA's Inspector General concluded that "We believe the ENERGY STAR program has sought to maximize the number of transactions of qualified products at the expense of identifying products and practices that maximize energy efficiency" (EPA IG 2010, 12). Manufacturers may have more or less success than the DOE and EPA in convincing consumers, but establishing credibility is never costless. We don't consider fuel scarcity a market failure. Why should we consider trust scarcity to be one?

Engineering studies frequently ignore the full costs of investments. Engineering analyses often claim to compare more and less energy efficient versions of products delivering equivalent services, but ignore that only consumers and not engineers can offer a final assessment of this. Susan Dudley (2000) reports survey evidence of a consumer preference for top-loading clothes washers, which were at risk of being forced off the market in favor of more energy efficient front-loading models. Jeffrey Tucker (2015) discusses many consumers' frustration with low-flush toilets. The DOE's analysis of proposed standards for residential dishwashers used an estimate of the number of cycles per year for machines available before the proposed standards (DOE 2014, ch. 7). The analysis implicitly assumes that households accept the level of cleaning provided by the new models and do not adjust use based on observed differences in performance. Any reduction in consumer satisfaction due to modified product attributes should be included as a cost.

Other cost omissions seem even less defensible. Estimates of savings through electric utilities' conservation programs often include only the costs incurred by the company, not customers, and thus overstate the return on conservation and the tragedy of a failure to invest (Joskow and Marron 1992; Allcott and Greenstone 2012). The Federal Weatherization Assistance Program has assisted 7 million low-income households since 1976, but assessments typically exclude several costs of household participation, including the onerous application process, the need to meet with the inspectors and contractors, and the

4. The same presumption of credibility applies to the documentation submitted by manufacturers to demonstrate that models meet energy efficiency standards. Energy efficiency standards will be less coercive than they might appear if bogus documentation goes unchallenged and less efficient models are allowed to remain on the market.

inconvenience of having work done in their homes (Fowlie et al. 2015a). Meredith Fowlie, Michael Greenstone, and Catherine Wolfram (2015b) estimate that with all relevant costs included and energy savings accurately measured, the rate of return on investment for weatherization is −9.5 percent a year.

Customers might fail to accurately forecast energy prices, contributing to a purported paradox, but again we are dealing with hardy facts that must be incorporated fairly. Many energy efficiency investments have an expected life upwards of 15 years, and price expectations over such an extended period must be rough guesses even to our best wizards. Energy experts sometimes fail to forecast even major price movements, such as the declines in natural gas prices after 2009 and oil prices since 2014. A decade ago numerous experts and books declared the end of cheap oil (see, e.g., Heinberg 2005; Roberts 2004). Consumers face knowledge costs in obtaining and comprehending energy price forecasts, in assessing the credibility of alternative forecasts, and in taking on new decisions. Yet as David Henderson (1985) observed, consumers appear to have better anticipated the oil price declines of the 1980s than did industry experts. Even should consumer forecasts of future prices happen to exhibit, as some allege, a downward bias, it is inappropriate to treat a failure to solve a challenging forecasting exercise as evidence of foolish decisionmaking.

One man's efficiency is another man's ordeal. What do researchers really know about the particularistic world of the individual man or woman or business they presume to nudge or coerce?

A more reasonable test of whether people mind opportunities for energy efficiency is to see whether behavior is affected by energy prices and changes in energy prices. The evidence is clear: Energy prices and the lifetime cost of energy consumption matter. Jerry Hausman (1979), who provided the first evidence typically cited in support of the energy efficiency paradox, found that consumer choice could be rationalized by a discount rate of between 12 and 18 percent, a rate that is higher than the risk-free rate of return but not out of line with interest rates that households and even smaller businesses might face for borrowing. Mark Dreyfus and Kip Viscusi (1995) found similar results. Recent papers have examined changes in car prices along with changes in gas prices. The prices of more and less fuel-efficient cars afford a relatively clean test of whether the expected cost of energy use affects current decisions. James Sallee, Sarah West, and Wei Fan (2015) find that used car prices change to fully reflect a change in gas prices. Meghan Busse et al. (2013) find a significant change in the market shares of the most and least fuel-efficient new car models in response to an increase in gasoline prices. They also find that sales of used cars adjust in a manner consistent with the interest rates that car buyers face in the market. Hunt Allcott and Nathan Wozny (2014) find that used car prices change to reflect about 70 percent of a change in gas prices. Proponents of strict market efficiency might point to the first two studies for support, while Allcott and Wozny (2014) has been cited as evidence of myopia. I read all three studies as showing that energy efficiency matters to consumers.

The proposition that Americans do not adequately mind energy efficiency opportunities affects policy, particularly DOE regulations. Private benefits provide the cost-benefit justification for recent DOE energy efficiency standards. As Miller describes it, the DOE "believe consumers are not adequately equipped to trade off upfront price increases against long-term energy savings. Overcoming this presumed cognitive failure is the primary focus of DOE's energy conservation standard" (2015, 6–7). But as Gayer and Viscusi (2013) note, the regulatory impact analyses of these proposed regulations provide no more than general reference to the (allegedly well-established) proposition that decisionmakers systematically ignore energy use savings. The 2014 standards for commercial clothes washers exhibit the extension of this thinking to its natural, albeit dubious, limit. The DOE projected that the new standard would generate $38 million in annualized benefits, $30 million of which were private benefits, against $30,000 in annualized costs (Miller 2015, 28, rule #1904-AC77), which would imply an opportunity for a 1,000-fold bang for the buck! Such a benefit-cost ratio might be dismissed as preposterous propaganda—and rightly so. It also reflects institutionalization of the DOE's research propaganda. The autonomy and moral worth of individuals is the foundation of the liberal society of voluntary exchange and limited government. Persons who so disdain their fellow citizens' capacity as to suspect that for-profit businesses (which are free to hire energy efficiency experts as consultants) will fail to make an investment yielding $1,000 in benefits for every $1 in cost should not serve in the government of a liberal society. And economists should be wise enough to incorporate into their research the old adage that an offer that looks too good to be true probably isn't.

Mandating use of renewable energy in electricity production

Another area in which the DOE discredits itself by issuing propaganda is in the matter of mandating renewable energy in electricity production. For decades national and state governments have promoted and invested in alternative or renewable energy sources (Vietor 1984; Morriss et al. 2011). And perhaps not surprisingly, the DOE extols the enormous benefits allegedly provided by such investments and subsidies. Consider a recent restatement of the benefits of renewable energy:

> Decades of investments by the federal government and industry in five key clean energy technologies are making an impact today. The cost of land-based wind power, utility and distributed photovoltaic (PV) solar power, light emitting diodes (LEDs), and electric vehicles has fallen by 41% to as high as 94% since 2008. The cost reductions have enabled widespread adoption of these technologies with deployment increasing across the board. … These technologies are now readily available and our country has already begun to reap the benefits through their increased adoption. (DOE 2016b, 1)

One related policy is mandating that electric utilities use more electricity generated from renewable fuels, or Renewable Portfolio Standards (RPS). Although states and not the DOE have adopted RPS, the DOE is responsible for the propagandistic claim that such mandates will not increase and could even lower the cost of electricity.

RPS sets thresholds for the minimum amount of electricity that utilities must supply from renewable energy sources, and have been set by states. Consumers pay for electricity generated from renewable sources regardless of whether these sources are cost competitive. The burden on consumers derives from the government control of public utilities. A public utility is granted by government an exclusive franchise for a geographic area, with its rates and terms of service subject to approval by a state regulatory board. Utilities operate under a common carrier rule, meaning that they must sell to all customers willing to purchase at the regulatorily approved terms. Public utilities regulation burdens consumers by allowing purchase only from the designated monopolist, and the terms of service can only be influenced by lobbying the regulators.

RPS imposes requirements on utilities to generate or purchase a minimum amount of power from renewable sources like solar or wind power (what qualifies as "renewable" differs across states). Since utilities operate on some variant of cost of service regulation, the costs of renewable-fuel-source electricity will be passed on to customers. Thus an RPS provides a hidden subsidy to politically favored fuel suppliers and electricity suppliers, on top of other forms of assistance like federal loan guarantees and tax credits.

The first state to adopt an RPS was Iowa in 1983, with Massachusetts and Nevada being next in 1997. Currently 29 states plus the District of Columbia have a mandatory RPS, while eight states have voluntary standards.[5] A national RPS has been proposed but has not been adopted to date.

5. West Virginia repealed its mandatory RPS, while Ohio has a two-year freeze on its mandatory standard, but it remains on the books. For details on state RPS standards see Durkay (2016) or the Database of State Incentives for Renewables & Efficiency (link).

A typical standard will specify that 10 percent of electricity must be generated from renewable sources beginning in a given year. States' rules differ in exactly which fuels count as renewable, and some have provisions to exempt compliance if the price of renewable energy is too high (see Michaels 2008). The threshold and year in which the standard must be first met vary, and some states have separate initial thresholds and higher ultimate thresholds. Hawaii's RPS requires at least 30 percent renewable fuel production beginning in 2020, rising to 100 percent by 2045. States also differ in the threshold for renewables use applied to different types of utilities, with investor-owned utilities sometimes held to a higher standard than municipal or cooperative providers.

Consider a utility purchasing electricity from suppliers using renewable and nonrenewable fuels. Think about the stripped-down, admittedly simplistic textbook model: The supply from both fuels is competitive, the utility makes purchases to minimize cost, and they will equate the marginal cost of electricity from each source. That is, profit maximization leads to resource cost minimization.[6] Mandating the use any other mix of fuels consequently must increase cost. Now, it is fine to depart from that simple model: But do the departures really turn the basic logic of cost minimization on its head, such that mandating higher-cost inputs would not increase costs to the firm? To achieve that, the departures would have to be pretty remarkable—and should satisfy our demands for plausibility. And shouldn't those imposing coercion bear the burden of proof when it comes to showing the net benefits they promise to achieve?

More than a dozen studies have estimated that an RPS would only modestly increase or might even decrease the price of electricity (Wiser and Bolinger 2007). The studies generating this result use the National Energy Modeling System (NEMS), compiled and updated periodically by the DOE's Energy Information Administration (EIA). As Robert Michaels (2008) explains, the NEMS has hundreds of equations arranged in modules created by different groups, makes literally thousands of assumptions, and has 3,500 pages of documentation. Users are given the opportunity to make selections among certain model assumptions as well. Ultimately the complexity of the modeling system ensures that no more than a handful of specialists fully understand its workings.

How then did studies using NEMS find that fuel purchase mandates overturn a fundamental principle of cost minimization and possibly lower electricity prices? Studies by Ryan Wiser and Mark Bolinger (2007) and Carolyn Fischer (2010) identified natural gas prices as the channel; Fischer also emphasizes the

6. Electric utilities have been subject to public utilities regulation by state governments and thus perhaps should not be viewed as maximizing profit prior to the implementation of an RPS. This point has not been offered as part of the story of how an RPS mandate will lower cost.

relative elasticities of supply for electricity produced from natural gas and renewable sources. To reconcile the projections with the assumption that the firm is interested in reducing its costs, researchers offer the following pecuniary-externality story: The reduced use of natural gas to generate electricity due to the RPS reduces the price of natural gas and the price of electricity produced using natural gas. This price reduction creates a transfer of producer surplus from natural gas suppliers to electric utilities. The wealth transfer gets passed on to electricity customers through average cost pricing and is treated by the studies as a welfare gain, even though it is not—the gain for consumers corresponds to a loss for natural gas suppliers, a loss somehow overlooked by the analysts. The studies do show that the resource cost of electricity produced is increased by an RPS. The proposition therefore I think is more misleading, than wrong. Prices normally reflect the cost of production to society. Because an RPS also effects a wealth transfer from the suppliers of natural gas, this masks the higher resource cost of electricity.[7] Normally in markets, lower prices reflect lower resource costs, and a decline in the real price is a signal of progress over time. The higher resource cost of electricity production with an RPS means that the economy will be poorer, not more prosperous, despite a possible decline in electricity prices.

Another reason why the incorrect inference contained in the proposition is not wholly innocent is the use of modeling results as if they were evidence from the world. Predictions must always be compared with reality, especially since RPS will mandate the supply of larger quantities of electricity from renewable fuels than ever supplied before, and so the NEMS model must be relying on assumptions about the cost of this supply, which could prove wildly inaccurate. Ignoring actual prices is misleading, to put it mildly, because electricity prices are higher in states with binding RPS provisions. I gathered data on the matter, shown in Table 1. The table reports the average all-sector retail electricity price for states in each category during the fall of 2014. The table also reports the change in the retail price over the previous year. I divide states into three groups: no RPS, a voluntary RPS, and a mandatory RPS. I omit Alaska and Hawaii since their electricity markets are not integrated with the contiguous states.[8] States' RPS requirements vary substantially, and a mandate that 10 percent of electricity be generated from renewable fuels presumably impacts a market less than does a 40 percent standard. So Table 1 also reports the average price for the states with an ultimate RPS threshold in excess

7. Ignoring, as mentioned earlier, external cost arguments for renewable fuels.

8. I distinguish voluntary RPS states from states without an RPS because a voluntary RPS may signal to utilities the likelihood of a future mandatory rule, affecting fuel choice today. Hawaii has a mandatory RPS, while Alaska has no RPS, and inclusion of both states has little effect on the difference in average price between no RPS and mandatory RPS states. All of the states with mandatory RPS in Table 1 had a mandate in place since at least 2008, allowing time for purchases to affect decisions and costs.

of 20 percent. Electricity prices were 29 percent higher and price increases one percentage point higher in states with a mandatory RPS than in the no standard states. Average prices were 40 percent higher and the price change almost two percentage points higher in states with the strictest RPS thresholds. The averages in Table 1 show that the predictions from NEMS-based assessments to be at odds with observed prices.[9] States with stricter RPS requirements have consistently had higher electricity prices since at least 2010; the year-to-year changes in prices show more variation. This simple cross-sectional comparison of prices cannot hope to prove causality, since states with mandatory RPS could have had higher electricity prices prior to enactment of the mandates. But higher electricity prices in RPS states is a fact that must be addressed by a serious argument that renewable electricity mandates will not raise costs.

TABLE 1. State retail electric prices and renewable portfolio standards

	Price of electricity, 10/2014, cents per kwh	Percent change in price of electricity 10/2013–10/2014
No standard	8.85	3.21
Voluntary	9.03	3.61
Mandatory	11.48	4.22
Mandatory, threshold >20%	12.39	5.00

Source: Author's calculations (Excel file **here**), using prices from the Energy Information Agency and status of state Renewable Portfolio Standards as of January 2015 from the Database of State Incentives for Renewables and Efficiency. *Notes*: Alaska (no RPS) and Hawaii (RPS with threshold >20%) are excluded from the above averages.

A different piece of evidence in support of the costless RPS mandate proposition was provided by a study from the National Renewable Energy Laboratory and Lawrence Berkeley National Laboratory (Heeter et al. 2014). This study formed the cost component of a more recent overall analysis of RPS (Wiser et al. 2016). Jenny Heeter and collaborators (2014) purport to examine evidence on costs of renewable fuels mandates from across the country. As the authors note, "Most of these policies have five or more years of implementation experience, enabling an assessment of their costs and benefits" (Heeter et al. 2014, iv). This study would appear to be evaluating the actual impact of RPS on electricity prices, as I suggested. Heeter et al. report an average incremental cost of RPS of about 1 percent on electricity prices, suggesting that the NEMS-based projections of a modest price impact are being borne out. Again, however, actual electricity prices are not examined; instead, Heeter et al. offer cost estimates based on the regulatory treatment of renewable fuels. This is misleading, for two reasons. First, politically determined prices are not market prices based on mutual agreement and do not

9. Michaels (2008) discusses the NEMS's general poor prediction record.

always reflect opportunity costs. Whether regulators allow utilities to pass the cost of renewable fuel purchases on to consumers does not affect whether electricity from renewable sources actually costs the utility more. Second, utilities are regulated on many margins, and regulators could easily let costs be passed on along some other margin. The regulatory treatment of renewable fuels is exactly the type of political action that can be taken for show without real effect. The authors acknowledge that the methods and assumptions made by regulators vary widely across states, that the reported cost figures exclude certain types of costs (e.g., estimates of the cost of wind power often exclude the cost of connecting wind to the grid), and that the figures they report "do not represent net costs to society, nor do they necessarily represent the costs ultimately borne by rate payers" (ibid., iv–v). But if the authors realize that the reported numbers have no connection to economic costs, why was the study titled, "A Survey of State-Level Cost and Benefit Estimates of Renewable Portfolio Standards"? Attempting to confuse the plain meaning of cost represents a not-so-innocent error.

State lawmakers and not the DOE have passed RPS. Still, the role of the DOE is clear, and it likely affected the diffusion of RPS mandates. We can first note the direct efforts of the DOE in the research. Five of the 12 studies reviewed by Ryan Wiser and Mark Bolinger (2007) were conducted by the DOE's EIA. The model-based predictions all use the DOE's NEMS. And Heeter et al. (2014) and Wiser et al. (2016) were produced by the NREL and Lawrence Berkeley National Laboratory, two DOE labs.

A second factor involves the timing of the research. The first studies reviewed by Wiser and Bolinger (2007) were conducted by the EIA and appeared beginning in 1998. All but two of the current mandatory RPS were enacted between 1997 and 2008. Renewable fuels do offer some benefits relative to fossil fuels, but the primary cost would be the use of more resources to supply electricity. Clearly if the cost can be claimed to be trivial, this makes an RPS almost appear to be a free lunch. Opponents of RPS in different states did produce studies claiming that electricity prices would be driven much higher by the mandates (Tuerck, Bachman, and Head 2011; 2012; Bryce 2012). At a minimum, the NEMS-based studies made the question of whether mandates had any significant cost a point of debate among experts, muting an otherwise strong argument against an RPS. The stamp of government approval lent distortion to the debate.

Concluding remarks

The propositions that Americans currently ignore the cost of energy use and that renewable fuel mandates might be costless are not only based on bad economics, but in duplicity. In view of government duplicity, I offer two points. The first starts with the NEMS, the complex energy market model used by studies claiming that RPS might lower electricity costs. Economists who understand that the market economy is a spontaneous order understand that loose pattern predictions, at best, can be made about the economy, and that even those are sometimes wrong. Economic policy should not be based on precise predictions of the magnitude of effects. Many actors in the economy, however, have an interest in pretending to be able to forecast economic variables. Many decisionmakers will use forecasting models, even if forecasts are dubious. A plurality of forecasting models probably generate benefits to society through the wisdom of crowds. Should government privilege any one model by making it official? Should government construct its own model to guide policymaking? This is what the DOE has done with NEMS. If the government builds official models, then the hundreds of assumptions involved all take on political significance. If the DOE constructs the model of the energy sector to be used for policy decisions, and if this model becomes the standard for academic research, the DOE is also constructing the measuring stick for use in evaluating its policies. There is great potential for mischief in selecting assumptions to achieve the desired assessments.

Second, the NREL illustrates a potential problem with government labs invested in one research area. Undoubtedly there may be gains from co-locating leading researchers on a topic at the same lab, making the resulting science more productive. From normal bureaucratic incentives to maintain one's organization and seek budget increases, however, the danger arises for a special purpose lab to become cheerleaders for such research, a label that I think could fairly be given to Wiser et al. (2016). A representative citizen might well choose to have government fund and perhaps even conduct research on specific technologies for using renewable energy. An investment in research to assess the potential of wind or solar might be prudent. The representative citizen, however, would want government to conduct the research impartially, and be willing to end research when a design shows little promise. Special purpose labs seem to run a risk of becoming special interests, at odds with the general interest in expanding the stock of knowledge. We should be concerned that under many guises the government uses taxpayer money to grow the government faction.

Appendix

An Excel file with the author's calculation used for Table 1 is available **here**.

References

Allcott, Hunt, and Michael Greenstone. 2012. Is There an Energy Efficiency Gap? *Journal of Economic Perspectives* 26(1): 3–28.

Allcott, Hunt, and Nathan Wozny. 2014. Gasoline Prices, Fuel Economy, and the Energy Paradox. *Review of Economics and Statistics* 96(5): 779–795.

Beaulier, Scott, and Daniel Sutter. 2012. The New "Benefits" of Environmental Regulation. American Energy Alliance (Washington, D.C.). **Link**

Bryce, Robert. 2012. The High Cost of Renewable-Electricity Mandates. February. Manhattan Institute (New York). **Link**

Busse, Meghan R., Christopher R. Knittel, and Florian Zettelmeyer. 2013. Are Consumers Myopic? Evidence from New and Used Car Purchases. *American Economic Review* 103(1): 220–256.

Demsetz, Harold. 1969. Information and Efficiency: Another Viewpoint. *Journal of Law and Economics* 10: 1–22.

Department of Energy (DOE). 2014. Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Residential Dishwashers. December. U.S. Department of Energy (Washington, D.C.). **Link**

Department of Energy (DOE). 2016a. Saving Energy and Money with Appliance and Equipment Standards in the United States. October. U.S. Department of Energy (Washington, D.C.). **Link**

Department of Energy (DOE). 2016b. Revolution…Now: The Future Arrives for Five Clean Energy Technologies—2016 Update. September. U.S. Department of Energy (Washington, D.C.). **Link**

Department of Energy Office of Inspector General (DOE IG). 2009. Audit Report: The Department's Management of the ENERGY STAR Program. DOE/IG-0827. October 14. U.S. Department of Energy (Washington, D.C.). **Link**

Dreyfus, Mark K., and W. Kip Viscusi. 1995. Rates of Time Preference and Consumer Valuations of Automobile Safety and Fuel Efficiency. *Journal of Law and Economics* 38(1): 79–105.

Dudley, Susan. 2000. Addendum to Public Interest Comment on the Department of Energy's Proposed Clothes Washer Efficiency Standards. December 4. Mercatus Center at George Mason University (Arlington, Va.). **Link**

Durkay, Jocelyn. 2016. State Renewable Portfolio Standards and Goals. December 28. National Conference of State Legislatures (Denver, Colo.). **Link**

Environmental Protection Agency Inspector General (EPA IG). 2010. ENERGY STAR Label Needs to Assure Superior Energy Conservation Performance. Report #11-P-00100. October 28. Environmental Protection Agency (Washington, D.C.). **Link**

Fischer, Carolyn. 2010. Renewable Portfolio Standards: When Do They Lower Energy Prices? *Energy Journal* 31(1): 101–119.

Fowlie, Meredith, Michael Greenstone, and Catherine Wolfram. 2015a. Are the Non-Monetary Costs of Energy Efficiency Investments Large? Understanding Low Take-Up of a Free Energy Efficiency Program. *American Economic Review* 105(5): 201–204.

Fowlie, Meredith, Michael Greenstone, and Catherine Wolfram. 2015b. Do Energy Efficiency Investments Deliver? Evidence from the Weatherization Assistance Program. *NBER Working Paper* 21331. National Bureau of Economic Research (Cambridge, Mass.). **Link**

Gayer, Ted, and W. Kip Viscusi. 2013. Overriding Consumer Preferences with Energy Regulations. *Journal of Regulatory Economics* 43: 248–264.

Government Accountability Office (GAO). 2007. Energy Efficiency: Opportunities Exist for Federal Agencies to Better Inform Household Consumers. GAO-07-1162. September. U.S. Government Accountability Office (Washington, D.C.). **Link**

Government Accountability Office (GAO). 2010. Covert Testing Shows the Energy Star Program Certification Process Is Vulnerable to Fraud and Abuse. GAO-10-470. March. U.S. Government Accountability Office (Washington, D.C.). **Link**

Government Accountability Office (GAO). 2011. ENERGY STAR: Providing Opportunities for Additional Review of EPA's Decisions Could Strengthen the Program. GAO-11-888. September. U.S. Government Accountability Office (Washington, D.C.). **Link**

Granade, Hannah Choi, Jon Creyts, Anton Derkach, Philip Farese, Scott Nyquist, and Ken Ostrowski. 2009. Unlocking Energy Efficiency in the U.S. Economy. July. McKinsey & Company (New York). **Link**

Hausman, Jerry. 1979. Individual Discount Rates and the Purchase and Utilization of Energy-Using Durables. *Bell Journal of Economics* 10(1): 33–54.

Heeter, Jenny, Galen L. Barbose, Lori Bird, Samantha Weaver, Francisco Flores-Espinol, Ksenia Kuskova-Burns, and Ryan H. Wiser. 2014. *A Survey of State-Level Cost and Benefit Estimates of Renewable Portfolio Standards*. NREL/TP-6A20-61042. May. National Renewable Energy Laboratory (Washington, D.C.). **Link**

Heinberg, Richard. 2005. *The Party's Over: Oil, War and the Fate of Industrial Societies*, rev. ed. Gabriola Island, Canada: New Society.

Henderson, David R. 1985. The Economics of Fuel Economy Standards. *Regulation* (American Enterprise Institute, Washington, D.C.), Jan./Feb.: 45–48. **Link**

Holcombe, Randall G. 1997. *Public Policy and the Quality of Life: Market Incentives Versus Government Planning*. Westport, Conn.: Greenwood Press.

Jaffe, Adam, and Robert Stavins. 1994. The Energy Paradox and the Diffusion of Conservation Technology. *Resource and Energy Economics* 16(2): 91–122.

Joskow, Paul L., and Donald B. Marron. 1992. What Does a Negawatt Really Cost? Evidence from Utility Conservation Programs. *Energy Journal* 13(4): 41–74.

Metcalf, Gilbert E., and Kevin A. Hassett. 1999. Measuring the Energy Savings from Home Improvement Investments: Evidence from Monthly Billing Data. *Review of Economics and Statistics* 81(3): 516–528.

Michaels, Robert J. 2008. A National Renewable Portfolio Standard: Politically Correct, Economically Suspect. *Electricity Journal* 21(3): 9–28.

Miller, Sofie E. 2012. Public Interest Comment on the Department of Energy's Direct Final Rule: Energy Conservation Standards for Residential Dishwashers. September 14. George Washington University Regulatory Studies Center (Washington, D.C.). **Link**

Miller, Sofie E. 2015. Whose Benefits Are They, Anyway? Examining the Benefits of Energy Efficiency Rules 2007–2014. September 2. George Washington University Regulatory Studies Center (Washington, D.C.). **Link**

Morriss, Andrew P., William T. Bogart, Roger E. Meiners, and Andrew Dorchak. 2011. *The False Promise of Green Energy*. Washington, D.C.: Cato Institute.

Roberts, Paul. 2004. *The End of Oil: On the Edge of a Perilous World*. Boston: Houghton Mifflin.

Rosenfeld, Arthur, Celina Atkinson, Jonathan Koomey, Alan Meier, Robert J. Mowris, and Lynn Price. 1993. Conserved Energy Supply Curves for U.S. Buildings. *Contemporary Policy Issues* 11(1): 45–68.

Sallee, James M., Sarah West, and Wei Fan. 2015. Do Consumers Recognize the Value of Fuel Economy? Evidence from Used Car Prices and Gasoline Price Fluctuations. *NBER Working Paper* 21441. National Bureau of Economic Research (Cambridge, Mass.). **Link**

Sutherland, Ronald J. 1991. Market Barriers to Energy-Efficiency Investments. *Energy Journal* 12(3): 15–34.

Tucker, Jeffrey. 2015. How Americans Destroyed Indoor Plumbing. *Beautiful Anarchy* (tucker.liberty.me), March 27. **Link**

Tuerck, David G., Paul Bachman, and Michael Head. 2011. The Economic Impact of Colorado's Renewable Portfolio Standard. February. American Tradition Institute (Washington, D.C.). **Link**

Tuerck, David G., Paul Bachman, and Michael Head. 2012. The Economic Impact of the Kansas Renewable Portfolio Standard. July. Kansas Policy Institute (Wichita, Kan.). **Link**

Vietor, Richard H. K. 1984. *Energy Policy in America Since 1945: A Study of Business-Government Relations*. Cambridge, UK: Cambridge University Press.

Viscusi, W. Kip, and Ted Gayer. 2016. Rational Benefit Assessment for an Irrational World: Toward a Behavioral Transfer Test. *Journal of Benefit-Cost Analysis* 7(1): 69–91.

Wiser, Ryan, and Mark Bolinger. 2007. Can Deployment of Renewable Energy Put Downward Pressure on Natural Gas Prices? *Energy Policy* 35(1): 295–306.

Wiser, Ryan, Galen Barbose, Jenny Heeter, Trieu Mai, Lori Bird, Mark Bolinger, Alberta Carpenter, Garvin Heath, David Keyser, Jordan Macknick, Andrew Mills, and Dev Millstein. 2016. *A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards*. NREL/TP-6A20-65005. January. National Renewable Energy Laboratory (Washington, D.C.). **Link**

About the Author

Daniel Sutter is the Charles G. Koch Professor of Economics with the Manuel H. Johnson Center for Political Economy at Troy University. He has published over 100 journal articles and book chapters. His research has spanned the areas of public choice, constitutional economics, Austrian economics, environmental economics, and the market for ideas, and covered topics including the constraint of government officials, the transition from authoritarian rule, automobile safety regulation, left bias in the news media and the academy, and the societal impacts of extreme weather. He is a senior affiliated scholar with the Mercatus Center at George Mason University. His email address is dsutter@troy.edu.

Go to archive of Watchpad section
Go to January 2017 issue