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TESTIMONY

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"The Contribution of the Social Sciences to the Energy Challenge"

Mr. Chairman and Distinguished Members:

Thank you for the opportunity to appear here today and testify on "The Contribution of the Social Sciences to the Energy Challenge." I am a senior research fellow at the Mercatus Center, a research, education, and outreach organization affiliated with George Mason University and located a short Metro ride away on the Arlington, Virginia campus. The Mercatus Center's mission is to bridge academics and policy: we conduct interdisciplinary research in the social sciences that integrates practice and theory. Toward that end, we have a variety of policy-relevant research programs and also operate the largest economics-based professional development program for congressional staff, called Capitol Hill Campus.

My own research focuses primarily on the causes and consequences of regulation – primarily "economic" regulation, including economic regulation of energy. I am not a model-builder, but I'm a big consumer of others' theoretical and statistical models. There's a perception in this town that the main thing economists supply to the policy process is numbers. When two economists disagree on the numbers, that gives rise to jokes with punch lines like, "You could lay all the economists in the world end-to-end and never reach a conclusion." In my view, the most important thing economists can supply to decision makers is not numbers, but understanding. Reasonable researchers may sometimes hold differing views about the *size* of the effects of various policies, but there's a lot more agreement among economists on basic underlying principles that help

[1] The views expressed in this testimony are solely my own and are not official positions of the Mercatus Center or of George Mason University.

explain human behavior in a predictable way: people try to do the best they can with what they've got, consumers buy less of something if the price goes up, price controls imposed on competitive markets tend to create shortages, monopoly harms consumers, trade makes both parties better off, individual decisions can make society worse off if there are significant "externalities," and so forth.

I doubt you will get much disagreement from this panel on whether the social sciences have a role in energy policy. Energy enables people to do things they could not otherwise do, or could only do at very great cost and inconvenience. Energy allows us to maintain and improve our quality of life. In other words, energy should be the servant, not the master; energy is a means of enhancing human welfare, not an end in itself. Since the social sciences study how people interact, the social sciences are necessary if we want to understand the effects of energy, and energy policy, on people.

We should keep in mind both the contributions and the limits of the social sciences; they are necessary but not sufficient to make policy choices. Effective decision making requires two things: knowledge of the consequences of alternative courses of action and value judgments that allow the decision maker to determine which consequences are the most desirable. Like any of the sciences, the social sciences are tools for understanding causation—what *is* and what *would likely* happen as a result of various policy initiatives. To decide what *should be done*, decision makers must combine the results of the analysis with value judgments that reflect their assessment of what is worth doing. No analytical model, no matter how complex, can automatically crank out the "right" policy decision.

But just as analysis is not a substitute for judgment, values are not a substitute for understanding reality. Values determine what outcomes decision makers would want to pursue, but values alone do not provide the cause-and-effect analysis necessary to determine how those outcomes can be accomplished most effectively. At least as important as how options can be accomplished most effectively is the analysis of unintended consequences. Without the firm grounding in reality provided by social science, decision makers are flying blind. The social sciences, and science generally, are crucial to policy because reality isn't optional.

The subcommittee's invitation to testify posed three questions; I'll take each in turn.

1. *How predictive is a purely economic approach to evaluating the impact of energy policy on individual and communal behavior? What factors other than price signals need to be considered when developing and applying economic models to energy-related behaviors?*

Let me start with the second question first. Real policy problems do not respect disciplinary boundaries. For this reason, it's most useful to think of different social sciences as complementary sets of tools for understanding reality, rather than different ways of understanding that are in opposition to each other. In other words, we don't need

to decide whether an "economic" or "psychological" or "sociological" approach is the right one. Properly understood, each is a different piece of the puzzle. All of these examine these questions from a different perspective and provide valuable insight.

Let me put it another way, using a simple syllogism that we frequently employ when analyzing the effects of policy in the economic education programs the Mercatus Center runs for congressional staff: *Institutions* generate both *incentives* and *knowledge flows* that shape human interaction, and human interaction leads to *outcomes*. That's just one sentence, but it requires many social sciences to understand all the implications. Let me explain.

Institutions are the established ways of doing things. They may be formal and explicitly enforced, such as laws and regulations, or they may be informal, such as culture, ethics and social norms. Institutions define the "rules of the game"—what is considered permissible and impermissible behavior. They also shape the way people perceive and interpret what's going on around them.

Incentives are whatever motivate people to act. They may be monetary or non-monetary. Cash, fame, a desire to "do the right thing," a desire to "go along with the crowd," or the prospect of a pleasant afterlife are all incentives.

Knowledge can be objective information that can be written down and transferred. But a great deal of knowledge is highly dispersed. Much relevant knowledge is tacit; as physical chemist and philosopher of science Michael Polanyi put it, "We know more than we can tell."[2] Public policy can have a significant effect on the extent to which people utilize and act on dispersed and tacit knowledge.

Outcomes are the things we actually observe people doing and the consequences of those actions. Outcomes can be the intended effects of a policy, or they may be unintended consequences. The policymaking process should identify desired outcomes, identify ways of measuring the policy's effect on those outcomes, and also identify and analyze potential unintended consequences. Indeed, in the Government Performance and Results Act, Congress required federal agencies to do this for their most important strategic goals. Agencies are supposed to articulate the major outcomes they are trying to achieve, measure whether they have achieved them, and match outcomes with information on resources and costs.

Returning to my one-sentence syllogism, we can start with the fact that, although public policy ultimately seeks to influence outcomes, it can only directly alter institutions. The fact that a policy is *intended* to achieve a particular outcome does not guarantee that the policy will achieve the outcome. Policy can only alter institutions—mostly the formal institutions, such as laws and regulations. The problem is, behavior does not necessarily change exactly as policy makers intend; many other factors come into play. The behavior of people changes as the incentives and knowledge flows change. To understand the effects of a policy, decision makers need to understand how the policy

[2] Michael Polanyi, *The Tacit Dimension* (1974), p. 4.

change alters knowledge flows and incentives, and how those in turn affect both producer and consumer behavior—all the subjects of social science research.

What's the role of economics in this big picture? Most contemporary economics textbooks define economics as the study of how people satisfy unlimited wants with limited resources. "Unlimited wants" are the things that people value, for whatever reason. "Limited resources" simply means that neither individuals nor our entire society have enough resources to get everything we can imagine we want. Whenever people try to do the best they can with what they've got, economics helps us understand the decisions they make.

Now let me turn to the first question: "How predictive is a purely economic approach to evaluating the impact of energy policy on individual and communal behavior? *Predicting* what decisions people will make requires that we know something about what specific wants people have, what their priorities are, what possibilities they perceive, and what resources they believe they have or can get. This is where other social sciences enter the picture. Psychology, sociology, anthropology, neuroscience, sociobiology, and numerous other social sciences help us understand what people want, why they have the wants they have, how and what opportunities they perceive, what wants and methods they regard as "proper" and "improper," how values and wants change, which opportunities for innovation will get noticed and acted upon, and numerous other questions that must be answered to predict how people will react to particular policies.

Here are a few of the many questions that economics either cannot answer or cannot answer by itself:

- How do particular formal and informal institutions emerge and change over time? This includes laws, culture, ethics, norms, and other social influences that guide behavior.

- Why do many individuals follow group norms, and why do some decline to do so?

- What factors count as incentives for individuals in particular situations?

- How does the way people receive and process information affect their behavior?

- How do institutions, incentives and knowledge flows alter the "mental models," heuristics, and "rules of thumb" that guide individual decisions?

I hope it's clear from this brief description that the relationship between economics and other social sciences should be one of complementarity, not conflict.

These comments on the role of economics and other social sciences are somewhat esoteric. A few concrete examples from energy policy might help make my meaning clearer.

One of the most basic insights of economics is that price controls tend to create shortages when the controlled price is below the price that would otherwise occur in the market. In the 1970s, the U.S. imposed an extensive system of price controls on oil and gasoline. Gas lines resulted, because there was no incentive to conserve, and no signal that people could use to figure out how much to conserve. We had a similar experience in the 1970s with natural gas price controls.[3]

In recent years, oil and gasoline prices have been relatively unregulated. When this is the case, prices send signals to consumers and producers about the true state of the world, and those prices change quickly with changing situations. Regulation of prices will always distort these signals although governments have tried this throughout history. Rent controls (held artificially low) have caused shortages in the supply of rental housing, and minimum prices on airline tickets increased consumer costs and caused people to take fewer flights than they would otherwise. Today, changes in crude oil prices caused by events anywhere in the world translate quickly into changes in retail gasoline prices. Nobody likes paying $2.50 or $3.00 per gallon for gasoline, but the rising price of gasoline in recent years has given consumers a message and an incentive: stay away from the pumps unless gasoline is worth at least this much to you. So we don't have gas lines, and nobody has to sleep in their cars to get a good place in line even when the price of oil hits $80 per barrel, as it did last week

Oil and natural gas provide textbook examples of how economic principles can provide valuable insight on the fundamental causes of controversial policy problems. This isn't just a figure of speech; the examples really are used in textbooks to illustrate the effects of price controls.[4] Note that social science examines not just consumer behavior, but producer behavior as well. Prices send strong signals to motivate the appropriate behavior to match supply and demand.

I don't think any new discoveries in the analysis of human behavior have undermined this explanation of why we had gas lines in the 1970s but don't have them today, or why we had natural gas service curtailments in the 1970s but don't have them today. Price controls encouraged us to waste gasoline and imposed tremendous human costs in the 1970s; decontrolled prices penalize that kind of waste now. Ditto for natural gas. And I doubt that advances in research on human behavior would give us reason to

[3] In their classic study of natural gas price controls, Stephen Breyer and Paul MacAvoy concluded that natural gas regulation's "major objective – benefiting the household consumer – was not achieved … regulation denied consumers gas reserves for which they would have been willing to pay." The that regulation imposed on households outweighed any benefits households received as price controls redistributed wealth from gas producers to consumers. See Stephen Breyer and Paul MacAvoy, *Energy Regulation by the Federal Power Commission* (Brookings, 1974), pp. 86-87.

[4] See, e.g., W. Kip Viscusi, John M. Vernon, and Joseph E. Harrington, Jr., *Economics of Regulation and Antitrust* (Lexington, MA: D.C. Heath, 1992), Ch. 18.

think that the effects of price controls on consumer and producer behavior would be qualitatively different in the future.

Maybe the *size* of the effect would be different: if there's more of a conservation ethic now and we reinstituted price controls, maybe people wouldn't waste as much gasoline as they did in the 1970s. And if we had gas lines again, a better understanding of what drives individual decisions could also aid in crafting effective public-service messages to discourage people from going to the gas station just to top off their tanks. But I doubt any change in values or behavioral factors would lead people to consume *less* gasoline as a result of price controls that drove down the price.

I didn't mention price controls just because I wanted to discuss the 1970s; distortions due to price controls still exist in some energy markets today. Retail price regulation of electricity is a good contemporary example. Most American consumers pay the same price for electricity regardless of the time of day they choose to use it. This increases electricity demand at peak times, and it may increase overall demand as well. My own household is a good example of this. The previous owner installed a washing machine and dishwasher that can be programmed to start on a time delay, so they can run in the middle of the night. But the power company's pricing tells us it doesn't really matter when we run the appliances. The resulting increase in peak power demand artificially increases resource use, electricity prices, and environmental costs—if only because more peak-load power plants must be built. Dynamic pricing that promotes conservation or shifting of use to off-peak times would be a "win-win" for consumers and the environment. It would reduce the likelihood of peak-load price spikes in the bulk power market while making some new power plant construction unnecessary. Pilot programs demonstrate that consumers—even residential consumers—will respond to the price signals provided by dynamic pricing.[5]

Thus far, you probably think it sounds like I'm saying that economists already know what's important to know for energy policy, and we can't learn anything from other social sciences. Nothing could be further from the truth. I don't think other social sciences' research on human behavior overturns any fundamental economic laws if we really understand what economics has to offer. But I do think this research can supply critical information that can help us understand how established practices, habits, and routines change; how policy affects behavior in situations where many people are motivated by factors other than price; or how institutional and behavioral factors affect the size of individuals' response to policy changes.

Dynamic electricity pricing, for example, is not being adopted very rapidly. In her survey of dynamic pricing issues and pilot programs, Northwestern University economist Lynne Kiesling notes a variety of barriers. Some are formal institutions, such as the rate

[5] Lynne Kiesling, "Retail Electricity Deregulation: Prospects and Challenges for Dynamic Pricing and Enabling Technologies" (May 4, 2007), http://www.law.northwestern.edu/searlecenter/papers/Kiesling_Annual_Rev_Final.pdf.

structures traditionally adopted by state regulators. But she also notes that inertia stems from what might be called cultural barriers:

> The most important, yet also the most intangible and difficult to change, obstacle to dynamic pricing and enabling technologies is the set of incentives for inertia. The primary stakeholders in the industry—utilities, regulators, and customers—all have status quo bias . . . Customer inertia is deep because they have not had to think about their consumption of electricity and the price they pay for it. . . .[6]

The marketing of "green" electric power presents another interesting and informative example. Where they have the freedom to do so, many consumers choose to purchase green power even though it costs more. Clearly, something other than price is important to these consumers. If a goal of public policy is to induce people to buy more green power, then it's important to know what factors motivate people to buy it even though it's more expensive—and it's equally important to know how a *change* in any factor, including but not limited to price, would change the amount of green power people decide to purchase. Do people buy green power because they want to contribute to measurable improvements in environmental quality? Or because they want to reduce carbon emissions? Or because it's the "in" thing to do and they want to be with the crowd? Or because they want to make a statement about their own values regardless of what everyone else is doing? The answers to these questions probably imply very different public policy and marketing strategies, and behavioral science can help answer these questions.

People also make tradeoffs. If policy alters the desirability of green power along several different dimensions in opposite directions, then the amount purchased might go up or down. Knowing how important the different dimensions are would help us identify whether a particular set of policies would ultimately increase or decrease sales of green power. Market research informed by psychology can help us find out which other attributes of green power matter to consumers, and what kinds of tradeoffs consumers are willing to make.

In short, I don't think new research on human behavior allows us to discard what we know from economic analysis. The real contribution of this research is that it helps us understand behavior in situations where people's motivations, perceptions, and limitations were previously not very well understood.

2. *To what extent are policies to influence individual and community energy use being shaped by what has been learned from research in the social sciences, including economics?*

[6] Kiesling, p. 37.

This is a huge question, to which there is no simple answer. I certainly hope we as a nation have learned something from the experiment with price controls in the 1970s. On a smaller scale, there are certainly examples of situations where research in economics or other social sciences is being used either to design policies or test their actual effects. One of the most ambitious pilot programs testing consumer acceptance of dynamic electricity pricing, for example, is the Olympic Peninsula GridWise Demonstration Project, led by the Pacific Northwest National Laboratory.[7] Federal policy seeks to encourages dynamic pricing and other forms of "demand response" that reduce electricity use at peak times.[8]

However, I've also seen cause for concern. When teaching in Mercatus Center programs for congressional staff, time and again I hear feedback to the effect of, "I understand what you're saying about what's good public policy, but you have to realize we do things for other reasons on the Hill." One of my favorite examples was legislation enacted in 2003 which gave the Federal Trade Commission a 180-day deadline to enact a regulation requiring optometrists to furnish patients with a copy of their contact lens prescriptions, but a 365-day deadline to perform a study that would help determine whether the regulation was necessary! (I mention his not because I think this was a bad regulation, but because the process just seems backward.)

When researchers at the Mercatus Center talk with federal agencies about the importance of measuring their outcomes and assessing how much of the outcome was caused by the policies they implement, we get the distinct impression that many career agency managers doubt whether Congress really wants to know about actual policy outcomes. In at least one case, an agency manager told me he does not believe Congress wants the agency to identify clear outcomes, because if specific outcomes were identified, that would erode support for the policy!

Thus, actual practice sometimes seems to contradict the congressional intent clearly stated in the Government Performance and Results Act.[9] Discovering why this happens would be an interesting project for an interdisciplinary team of social scientists.

It would be helpful if lawmakers signaled their willingness to make use of social science research—both prospectively when considering legislation and appropriations, and retrospectively when conducting oversight. If every piece of authorizing legislation contained a clause stating what *specific* outcome or outcomes Congress expects the legislation to achieve, that would send a clear message that retrospective policy

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[7] Kiesling, p. 29.

[8] See, e.g., Federal Energy Regulatory Commission, *Assessment of Demand Response & Advanced Metering*, Staff Report (Sept. 2007), http://www.ferc.gov/legal/staff-reports/09-07-demand-response.pdf.

[9] Section 3 of GPRA requires agencies to produce strategic plans that state their missions, goals, and objectives, "including outcome-related goals and objectives," and identify program evaluations used to reevaluate goals and objectives. A program evaluation is defined as "an assessment, through objective measurement and systematic analysis, of the manner and extent to which Federal programs achieve intended objectives. Section 4(b) requires agencies to produce annual performance plans identifying measures that will be used to assess "the relevant outputs, service levels, and outcomes of each program activity" and resources required to produce those results. Annual performance reports must compare actual program performance with the goals in the performance plan.

evaluation really matters. Another clear message would be a clause in each appropriation indicating *how much* of the outcome Congress expects the agency to achieve with the appropriation. If some policies were explicitly enacted as experiments, perhaps with sunset clauses and with an authorization and appropriation for independent program evaluation, that would help as well. As it is, even when agencies want to do program evaluation, it's often regarded as a distraction, a burden, or something they just don't have the time and resources to do. Building program evaluation into legislation could help raise its priority.

3. *What tools and methodologies are most appropriate for evaluating the effectiveness of policies to incentivize consumer behavior with respect to energy use? What kinds of basic research questions underlie the development of such tools and methodologies?*

A variety of tools and methodologies have been developed to evaluate the effects of policy on behavior: econometrics and other statistical techniques, surveys, field interviews, randomized field trials, laboratory experiments, archival history, and others. One type of laboratory experiment that consumer researchers frequently use is one that is the social science equivalent of a clinical trial, where consumers are given "conditions" that would either contain a stimulus (something that you want to evaluate to see if it changes behavior) and a control, without the stimulus. By varying pairs of stimuli and controls, social scientists can uncover which policies are likely to cause consumers to change their behavior. Practitioners of each technique can always point to aspects that could use further development.

But it's important that research in each discipline avoid becoming wedded to a particular methodology as the only path to truth. I know of economists, for example, who feel that manipulation of large data sets is the only "scientific" way to do empirical research. I've heard experts in program evaluation argue that randomized field trials are the only accurate way to gauge the effects of policy. No doubt we could find some social scientists with similar tunnel-vision in regard to other research methodologies. Federal research grants can either promote or discourage this kind of tunnel-vision, depending on what kinds of criteria are used to select research for funding. I don't have a specific complaint or solution in this regard, but just raise this as an issue that should be considered.

Conclusion

Policy changes at best affect some of the knowledge flows and incentives people face. Social science research bridges the gap between policy and actual outcomes by examining how knowledge flows and incentives change human behavior. Without social science, achieving the desired outcome is really a shot in the dark. Good social science doesn't guarantee that a policy will succeed, but it greatly raises the odds.