AN ENERGY POLICY ESSAY

A More Balanced Approach to Climate Change Policy

by Thomas F. Stephenson

Shultz-Stephenson Task Force on Energy Policy
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task force on energy policy

Our country urgently needs a more balanced approach to the global warming and climate change issue. On its own, it is a major policy problem, and it has also come to dominate discussions over our country's broader energy strategy. The current, starkly contrasting characterizations of the global warming and climate change problem and the solutions proffered by the polar opposites in the debate are neither accurate nor constructive as we strive to achieve a more sane policy approach to the issue.

In the current political environment, we can divide the global warming controversy into three areas of debate: (1) the human contribution to global warming, climate change, and the state of climate science, (2) the expected social and economic impacts of global warming–induced climate change, and (3) what to do about it. Each important element is addressed below. In our view, however, the most promising path forward lies in recognizing that the position one takes on any one of these three elements need not actually dictate one's views on the others. Despite today's political difficulties then, and perhaps surprisingly, our Task Force on Energy Policy at the Hoover Institution finds good reason to be cautiously optimistic that progress is being made and that good technology and policy options still remain.

Climate Change Science

Many who minimize the impact of rising CO_2 emissions in precipitating global warming and warming-induced climate change take the not unreasonable position that correlation is not causation. It is generally accepted that CO_2 emissions have increased significantly in recent decades. It is also fairly apparent, unless you use some precise and limited measurement periods, that we have seen significant warming around the globe in the last century. All one needs to do is observe what has happened in the Arctic Ocean or to many glaciers around the world in recent decades to conclude that the globe is warming. What is in dispute among some is the extent to which this warming of the globe is primarily due to the increase

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in human CO_2 emissions and how that linkage may play out into the future. Unfortunately, some overreaching in the UN's Intergovernmental Panel on Climate Change (IPCC) 2007 Working Group II report on global warming's climate impacts, although just a small part of the overall science, did not help the public debate and only hardened the positions of global-warming skeptics.

The science on this issue improves each year, though uncertainty does remain. Part of the problem in reducing the error bars to characterize the causal relationship between CO_2 emissions, global warming, and long-term climate change is that the evidence depends in no small part on counterfactual reasoning, complex modeling/simulation schemes, and understanding complicated logic theory. Our own conclusion, after viewing the physical evidence mentioned above and listening to a broad cross section of well-regarded scientists, is that the globe is warming and, at least in part, that that warming is undeniably due to the increase in human CO_2 emissions. In turn, this warming is likely to lead to broader long-term changes in the global climate. There is no other reasonable explanation for what has transpired, solar cycles or whatever. It is important that we continue to study the issue, but in our judgment the current scientific knowledge here is strong.

Climate Change's Human Impacts

There are also questions over the social and economic impacts, both positive and negative, of a changing climate. Whatever the degree of the causal relationship one accepts between human CO_2 emissions and climatic changes, it is worth considering both the potential extent and the regional or economic distribution that such impacts would have if they came to pass. Many serious attempts have been made to model this; the results are of course uncertain given the enormous complexities of making long-term forecasts not just on environmental but also on social systems. Taken together, however, they suggest that the net effect of climate change on national economies, human health, and the environment would be negative, ranging from benefits in some areas to substantial costs in many others. The underlying intuition here is that once a society has adapted to specific environmental conditions, any rapid external change in those conditions will incur adjustment costs. The global climate has certainly changed throughout human history, but the rate has generally been slower—and the global population and economic exposure smaller—than is the case today.

Given the uncertainty on this complex issue, one approach to thinking about potential climate impacts is to employ the insurance policy framework advocated during the Reagan administration with regard to the Montreal Protocol. Not everyone agreed with the scientific reasoning that human chlorofluorocarbon (CFC) emissions could deplete the global ozone layer. But the general consensus was that if such emissions *were* to deplete atmospheric ozone, the results could be catastrophic. Even with less than 100 percent certainty that CFCs were harmful—that is, if the skeptics were in fact right—it would, given the potential impacts, be

worth thinking about the best ways to switch to an alternative. The concept of a reasonably priced insurance policy was broadly accepted as a prudent approach to mitigate the potential consequential risks on an international basis. Similar reasoning seems applicable today with regard to our current best understanding of the potential dangers of CO_2 emissions.

What to Do?

On the question of what to do about climate change, ours is a realistic approach. We agree with most scientists who have seriously studied the issue on the causal relationship between human CO_2 emissions and a changing climate, and we also accept that it would be preferable to avoid the broad impacts that would likely result were global climate change to occur rapidly. Reaching such a conclusion, however, does not lead us to align with the global-warming alarmists who want us to precipitously abort our use of fossil fuels. To do so in the United States using current technology would be economically disastrous domestically and, on a worldwide basis, environmentally inconsequential. Climate change concerns should be an important input to our energy policies, not an overriding determinant. Important steps, however, can be taken—and, in some cases, already have been taken—to reduce the amount of CO_2 emissions released into our domestic atmosphere/environment. This should give hope to those who despair at our ability to address constructively the climate change issue without unacceptably compromising our economy or national security.

We have already seen marked progress in recent years as the result of the significant transition from dirty coal to natural gas–powered generation facilities and a dramatic increase in energy-efficiency practices throughout our economy. The transition from high-carbon-content coal to less-carbon-intensive natural gas has been driven in no small part by this country's determined entrepreneurial efforts to access plentiful unconventional gas resources in multiple locations around the country using hydraulic fracturing and horizontal drilling techniques. A number of small companies have built on the research and development investment in US corporate and public ledgers to enhance and employ the fracking technologies that have dramatically increased our accessible natural gas resources, driving down prices and reducing the cost of natural gas relative to coal. Natural gas is rapidly becoming a wonderful transition energy source from fossil-based to renewable fuels. Meanwhile, energy conservation and efficiency efforts are exploding throughout the public and private sectors, driven in part by the economic benefit of reduced costs and in part by mandates. California, for example, offered an early demonstration that growth in individual electricity use could be reduced without compromising comfort or economic performance. Today, similar efficiency efforts deployed under a principle of a positive benefit-to-cost balance have been taken up in most states around the country, with good results. The dramatic improvement in the fuel economy of new vehicles during the past decade

without unacceptably compromising performance, safety, or individual choice is another success most consumers appreciate.

It is important to recognize, however, that, even as we moderate our CO_2 emissions, we still must maintain and continue to improve on our existing energy systems and accumulated know-how, both of which are the best in the world and keep our lights on and wheels turning. A broad perspective is useful. Renewable energy—alongside other low-carbon energy such as nuclear and hydropower—is an appropriate longer-term goal from both an environmental and an economic perspective, but until installed costs are further reduced and technologies are available to better deal with the intermittency issues of solar and wind-produced power, we need the lower cost and reduced carbon content that natural gas provides.

Attacks on the fracking of shale gas from a safety perspective ignore the full context of our current energy transition. Legitimate issues exist regarding the appropriate fracking safety procedures to address methane release, surface impacts, water consumption and contamination, and earthquake precipitation. These are not good reasons, however, to ban fracking, but rather issues that are appropriately drawing scrutiny as to what safety procedures need to be implemented and who should have the regulatory responsibility to enforce compliance. Numerous experts have looked into these issues, including university researchers and respected environmental groups such as the Environmental Defense Fund (EDF), and concluded that the problems are manageable with appropriate diligence. The importance of the role that natural gas can play as a transition fuel both domestically and worldwide demands that we make every effort to find reasonable solutions to the above-mentioned issues. Progress in doing so is overall encouraging, though not without periodic setbacks.

It is clear, however, that even given the above legitimate environmental concerns, the expanded availability of natural gas today is saving lives by displacing coal-fired power generation, the local and regional air pollution from which leads to more than ten thousand statistical lives lost each year in this country alone. Each decade, more than half as many Americans die from coal-related air pollution as are employed in the coal extraction industry, from miners to executives. Coal is an exceptional resource in terms of its sheer energy content and abundant availability in this country. But the way we use coal today is irresponsible. New coal technologies may yet give us better use options, and we should sustain support for such research, given the magnitude of a potential payoff. Until then, the resource will be safe in the ground. Getting off dirty coal is not a simple or easy transition for the country, but it is one that can be made in a fair way, given the numerous net benefits in doing so—a transition substantially enabled by our newfound natural gas supplies.

Similarly, the current debate about granting approval for the Keystone XL pipeline to transport Canadian crude oil to our Gulf Coast is a case in point on the detrimental effect of symbolic political posturing around climate change strategy. The aggressive efforts of the green lobby to kill the XL pipeline make little economic or environmental sense. The Canadian oil sands will be drilled. If the oil is not transported by pipeline or other less-safe surface modalities to our Gulf Coast for processing, it will be piped to the Canadian Pacific coast and shipped from there to China or elsewhere in Asia, where the rapid rate of industrialization is already overwhelming the contributions that we or other developed countries have made on CO_2 emissions here at home. If that happens, all that will have been accomplished by anti–fossil fuel extremists is to ensure that the economic benefits of refining this crude will accrue to non-US companies with no net worldwide reduction in aggregate CO_2 emissions. Furthermore, from a national security perspective, a barrel of oil that we do not receive from Canada is, in effect, a barrel of oil that will come to us through the Strait of Hormuz or OPEC elsewhere.

An Energy Technology and Policy Strategy

Let's return to how we can bring about a more constructive debate on the subject of climate change, one not driven by extremists at either end of the spectrum. Today, more preexisting emotions and values are tacitly carried into political posturing around the climate issue than most participants likely realize. For now, we are unlikely to convince those who want our governments, federal, state, and even local, to ban fossil fuels immediately or the global-warming science skeptics, who believe that CO_2 emissions have no demonstrable negative impact on our climate, that there is a more balanced policy approach to be achieved.

Therefore we suggest to the skeptics that good global warming policy need not require expensive command-and-control government regulation. To the alarmists we say that global-warming science should not be an opportunity to impose broader—and potentially irrelevant—political and social values through favored policy instruments. To reach a broad consensus of those not positioned at polar opposite ends of the spectrum, we need an important commonsense discussion about the appropriate role of government in addressing the challenges of climate change. Right now such a discussion is certainly not taking place. Part of the problem is a bitterly divided and overly partisan atmosphere in Congress, but part of the problem is also an absence of leadership and management by the administration. Compromise is not a part of the current lexicon of Washington, DC. The proposed use of Environmental Protection Agency mandates, for example, has only exacerbated the political and policy divide and hardened positions on both sides of the aisle. We desperately need leadership from somewhere to move us toward a more balanced approach.

Energy Research and Development (R&D)

One area of general bipartisan agreement is that the federal government has an important role to play in helping provide sustained funding for research and development of new technologies for the transition to a non-fossil-fuel-based-energy economy and environment. Some of this R&D is going on in national government laboratories, but much is also being conducted in university research labs and in the private sector, both in large company laboratories and in smaller entrepreneurial companies, including start-ups. Where there is disagreement between the right and left regarding the proper role of government in this process is when government gets involved in the commercialization phase of technology development. To quote former secretary of the Treasury and Obama's national economic adviser, Larry Summers, "government makes a crappy venture capitalist." Let the private sector do what it does best. Nothing will have a greater impact on our world's ability to transition away from a fossil-fuel-based economy than creative technology development. As close observers of energy-related activities at both Stanford and MIT, we are very optimistic about the creative work being done in the laboratories of those two leading research universities. Some of the university research is government funded, but as much comes from the private sector. We are convinced that we will continue to come down the cost curve in wind and solar power equipment and produce battery solutions to deal with the storage issues associated with the intermittencies of wind and solar for power generation. We are equally confident regarding battery technology progress to address the limited range of electric vehicles now available and thus further decarbonize our transportation sector. Meanwhile, research continues to push the boundary of energy consumption performance for new lighting, electronics, industrial processes, and vehicles. Also encouraging is that large oil and gas companies are doing important research in their laboratories and in the field both to reduce the carbon content of the fuel mix and to ensure that new fossil supplies are available and affordable as long as they remain necessary.

Defense Energy

The US military has emerged as a natural platform to both drive and rapidly adopt new energy technologies to improve operational readiness and reduce energy bills—both of which are praiseworthy. Combined, defense-wide spending in 2012 on energy research, development, testing, and demonstration was $1 billion, though even this was but 1 percent of the department's total innovation budget. Where there is overlap with civilian needs, technologies that may still be near at hand for commercial markets may already be deployed and useful on military bases and in forward-deployed locations. Other military energy innovation may be more narrowly targeted at a particular tactical edge. There is a strong precedent here. The US military—from R&D to procurement and a massive ability to scale and deploy technology—has long been an early supporter of game-changing

technological innovations, including nuclear energy, Internet telecommunications, global-positioning systems, and solid-state transistors.

One advanced energy opportunity that may be well suited for defense needs are new, so-called small modular nuclear reactors (SMRs) that could operate passively and at the scale of a military base, rather than an entire city. This new generation of small modular reactors looks to have promise in replacing the aging and extremely capital-intensive, large-scale nuclear infrastructure in the United States and could be exported abroad or to remote regions such as the Arctic. Key regulatory issues on safety and staffing need to be arrived at for SMRs to have a chance in the US electricity market, and first-of-a-kind costs are expected to be prohibitive for civilian grid deployment by a conventional utility. Piloting this technology at the Department of Defense to gain experience could help address both issues.

A Level Policy Playing Field

Another area where government has an appropriate role to play in moving the United States away from a fossil-fuel-based economy is creating a more level playing field for competing energy technologies. Americans believe in level playing fields, and one can make a strong intellectual case that the marketplace needs some help in creating such a playing surface among competing fuels by pricing the externality of carbon. For those who strongly believe that CO_2 emissions are precipitating global warming and accompanying climate change, this is an easy case to make. For the global-warming skeptics, however, a more compelling case needs to be made. One approach is to return to President Reagan's CFC insurance policy approach, where just the chance that the potential damages may occur could be enough to warrant undertaking prudent costs today to avoid them, without wrecking the economy or unduly increasing the government's footprint. In doing this, let us consider how new, and better, government policy to create a level playing field could replace the often burdensome tax and regulatory maze that surrounds us.

Today, much of US climate change regulation occurs at the state level: renewable and energy-efficiency portfolio standards, utility revenue decoupling, energy-efficient building codes or retrofits, rooftop solar panel and energy-efficient appliance subsidies, customer financing mechanisms, thermal power plant licensing, oil and gas permitting, electricity and fuel pricing and taxes, alternative fueled-vehicle deployment mandates, even low-carbon fuel standards. Often responsibility for and the genesis of such programs are spread across various state regulatory bodies, such as utility, energy, or environmental commissions, plus the legislature and even the governor's office. Those state policies are overlaid by haphazard federal investment and production tax credits, accelerated depreciation schedules, and interstate grid regulations. On top of that, localities retain significant permitting jurisdiction. In discussions with state energy regulators,

utilities, and grid operators in California and other states, we have seen firsthand how some policies and programs seem to work well, whereas others may do more harm than good: in California, for example, the misguided Low Carbon Fuel Standard (LCFS) seeks to mandate advanced technology into existence alongside a political, rather than technological or market-compatible, timetable. State energy programs everywhere could benefit from improved internal coordination and a strategic vision that moves beyond crisis response or short-term political tactics to reduce regulatory risk in the energy investment landscape.

One attempt to create a more cohesive level playing field by directly pricing the externality cost of carbon has been the cap-and-trade systems employed in the European Union and here at home in several states, including California. So far, however, the results of these cap-and-trade systems have been anything but impressive. In Europe, high volatility and low emission-permit prices make it hard to argue that the cap-and-trade program has had a strong additional impact in reducing overall CO_2 emission levels, reflecting the fact that these extremely complex and subtle financial products lend themselves too easily to mischief, manipulation, or simple miscalculation in their implementation. In California, given the extensive green regulatory mandates already in place and that continue to be layered on, perhaps the largest impact of the cap-and-trade system has been the creation of a multibillion-dollar slush fund that will likely be used to fund ill-conceived or vanity programs such as the uneconomic high-speed rail system.

What we and a number of our colleagues believe is that a better way to price the externality of carbon and create a more level playing field is to pass a comprehensive and transparent national revenue-neutral carbon tax (RNCT) that would displace much of the existing energy and environmental regulatory maze. A tax on carbon will obviously raise the cost of fossil fuels relative to noncarbon-based fuels such as nuclear and renewables. Republicans will never support a tax that is simply viewed as another source of revenue to support the liberal, government-centric agenda and contains all the elements of fiscal drag. Depending on where the tax is assessed in the development and delivery chain and how revenue neutrality is accomplished, there will undeniably be winners and losers, with the biggest loser being the coal industry. The net result, however, will be a more level playing field between carbon and noncarbon-producing forms of energy with, in all likelihood, a net positive impact on the economy from putting RNCT dollars back into consumers' pockets, be that through a straight dividend or individual and corporate tax breaks. Some form of national border tariff adjustment would likely be needed to prevent foreign companies who do not impose a carbon tax from attaining a competitive advantage and undermining the desired impact of the RNCT. The most likely scenario in which we as a nation might have a sensible conversation about adopting a RNCT would be in the context of major tax reform. Strong advocates on both sides of the aisle urge major tax reform, but to date there seems to be little discernible agreement between the parties on what constitutes

acceptable reform. We need to be ready with a thoughtful proposal if and when the legislative opportunity arises. The Canadian province of British Columbia, though not a perfect analogue for the United States, has seven years' experience in operating a straightforward revenue-negative carbon tax (more is actually paid out each year in tax breaks and dividends than is collected), with good economic and environmental results and broad political support. That example makes it clear that we should be looking to our North American neighbors rather than to Europe for advice as we consider our options at home.

Beyond the subjects of sustained government support for R&D, defense energy, and the imposition of a playing-field-leveling RNCT, there needs to be a conversation about the appropriateness and extent of various government mandates and subsidies regarding energy sources and uses. Conservatives tend to be skeptical of market-distorting interventions by government, while liberals are frequently quick to advocate and employ government-centric solutions. The ubiquitous law of regulatory capture sees fertile ground in the contested pitch. The corn ethanol disaster is one high-profile intervention by government in which the law of unintended consequences has been on full display: mandating amounts of ethanol to be blended into motor fuels and then imposing tariffs on Brazilian sugar to protect domestic corn producers. In addition to being unachievable from a production standpoint, it drove food prices upward to the detriment of consumers, particularly those at the low end of the economic ladder. On the other hand, many, even on the right who are not total carbon impact skeptics, would probably acknowledge that the 1975 federal legislation imposing corporate average fuel economy (CAFE) standards' mandating fuel efficiency performance for new vehicles have been at least reasonably constructive in lessening national dependence on fossil fuels, with attendant environmental benefits. Not surprisingly, mandates issued down the chain of command in the military or in large companies do not meet the same level of resistance that such market-altering directives will be subject to when imposed by governments. On balance, however, it is probably prudent to say that, if conservatives are to accept the imposition of a national carbon tax, even one that is revenue neutral, there will need to be some accommodation regarding the extent to which the federal government can intervene in the free market. The overall benefits to the country of moving in this direction should create ample opportunity for policy negotiations, given the willingness of each side to address the other's political concerns.

An important aside is how to deal from a policy perspective with the fact that the bulk of current and looming CO_2 emission challenges are in the developing world and not here at home. The Kyoto Protocol was ineffective in trying to force global agreement on and compliance with universal emission goals; individual country situations and aspirations are too varied to lend themselves to a top-down global accord. It is one thing to have a concrete and achievable domestic agenda to then discuss in a bilateral or multilateral forum, but it is another to focus on international

targets before anyone has a clear idea of what to do to get there. For example, the Montreal Protocol's global agreement to phase out the use of chlorofluorocarbons was predicated on a technical R&D commitment by the DuPont Company to develop and supply to its customers a drop-in replacement product within five years. Without that practical course of action, there would have been no accord.

Going forward, we will be better off by first focusing on what we can make progress on at home and then trying to reach bilateral agreements with other major international polluters in which their selfish interests might somehow be aligned with ours. Ideally, we can use strategic collaboration to leverage each country's actual needs and technical abilities. For example, China knows that it has a major problem with air pollution in major cities and that dependence on dirty coal for power generation is the principal culprit. Perhaps we can help China figure out how to access its substantial shale or offshore gas resources through our more advanced capabilities in fracking or other advanced energy technologies. Similarly, India has long-standing interests in the broad development of affordable nuclear power that overlap with our own; in this area the United States has particular technical, business, and regulatory capabilities and thus bottom-up cooperation should be encouraged. As always in such dealings, protecting intellectual property will be a challenge for participating US companies. But there should be some win/win situations in this arena that do not involve unilaterally weakening international trade competitiveness or adopting expensive "boutique" first-of-a-kind carbon regulations at home that have little chance of being taken up among major polluters abroad.

Climate Change in Context

The climate change problem is relatively new, far reaching across our energy systems, and vexing—if not impossible, as we have suggested here—to address. But it is important to remember that climate change is not the only important energy issue we face.

Even as total energy resource availability seems to have improved in North America and elsewhere, energy security and reliability are more important than ever. A short disruption in electricity supply that may have been tolerable in years past now wreaks havoc in our real-time, information-centric economy. In addition to accidents and weather events, we now routinely see new vectors of attack on our energy infrastructure, both cyber and physical in nature. Beyond this defensive mind-set, it is worthwhile to consider how our energy systems and services can better meet our needs though improved performance, affordability, diversity, and customer choice. Billions globally continue to suffer from insufficient energy access. On the environmental front, we have not solved the problem of local pollution, even though local pollution's negative health impact today exceeds even many of the most pessimistic forecasts of future climate change damages. Finally, energy remains an important part of our national economy, not just for its impact on our

pocketbooks but also as a major economic sector in itself and thus a source of international corporate competitiveness or even national political relationships.

In consideration of these broader goals, our analyses to date suggest that technologies and policies to support the development of a more distributed energy system—with energy produced closer and better matched to its point of consumption—can help with both issues and the climate change problem as an important part of it. There may be other good approaches as well. But any long-term energy strategy needs to take full view of these diverse social priorities.

In sum, this discussion advocates a more balanced approach to the environmental security issues we face as a country. Many would suggest, however, that right now it is a pipe dream that such an outcome is achievable in today's highly contentious political environment. That is probably true, but one never knows when unanticipated events will unfold in ways that allow the unlikely to become the feasible. Those of us advocating a more balanced approach to energy and environmental policy need to be ready when such opportunity might unexpectedly present itself.

Acknowledgment

I appreciate the constructive contributions made by Jeremy Carl and David Fedor.

First printing 2014
20 19 18 17 16 15 14 7 6 5 4 3 2 1

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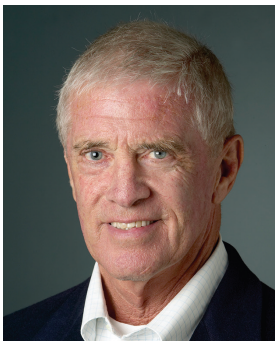

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Shultz-Stephenson Task Force on Energy Policy

The Hoover Institution's Shultz-Stephenson Task Force on Energy Policy addresses energy policy in the United States and its effects on our domestic and international political priorities, particularly our national security.

As a result of volatile and rising energy prices and increasing global concern about climate change, two related and compelling issues—threats to national security and adverse effects of energy usage on global climate—have emerged as key adjuncts to America's energy policy; the task force will explore these subjects in detail. The task force's goals are to gather comprehensive information on current scientific and technological developments, survey the contingent policy actions, and offer a range of prescriptive policies to address our varied energy challenges. The task force will focus on public policy at all levels, from individual to global. It will then recommend policy initiatives, large and small, that can be undertaken to the advantage of both private enterprises and governments acting individually and in concert.

For more information about this Hoover Institution Task Force, visit us online at www.hoover.org/taskforces/energy-policy.

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