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Beyond Preferences: Embracing a Competitive Energy Vision

Good morning, Chairman Upton, Ranking Member Rush, and members of the subcommittee. Thank you for the opportunity to testify before you today on the increasingly salient topic of energy tax policy. My name is Devin Hartman, and I am electricity policy manager and a senior fellow with the R Street Institute, a pragmatic free-market think tank. I have experienced and examined the effects of tax policy on energy markets at the state and federal level. My research specialties include the effects of government intervention on the electricity industry. What I offer today are my personal views.

A discussion on energy tax policy should begin with the full context of energy policy. Energy policy primarily concerns the oil, natural gas and electricity industries. Domestic energy policy has limited ability to affect oil market outcomes, where global economic forces remain the key drivers.[1] On the other hand, domestic policy is a principle determinant of market structure and outcomes in the natural gas and electricity industries. Deregulation of natural gas began in the 1980s, with mature markets emerging in the 1990s. About half the states initiated electricity restructuring (i.e., price deregulation) in the 1990s, although fewer executed full implementation that lasted through the 2000s.

Competitive reforms in the natural gas industry were a resounding success.[2] The more recent transition to electricity competition and consumer choice experienced substantial challenges, but the benefits are becoming increasingly clear. From 1997 through 2014, electricity prices in regulated monopoly states increased 60 percent, compared with 41 percent in restructured states.[3]

Research and experience have demonstrated immense advantages of competitive energy markets that incorporate the full costs and benefits of transactions among their participants. "Pure private" markets do not fully capture some benefits, such as research and development spillovers, or some costs, such as pollution externalities. Government interventions, including tax preferences, have sometimes helped to address these market shortcomings, but often result in costly unintended consequences that leave society worse-off. This underscores the importance of limiting government's role to correcting market shortcomings *efficiently*, with an underlying objective to enhance market performance.

Energy policy discussions frequently stray from a focus on market performance. Often they romanticize particular power-generation technologies that are associated with certain qualities like reliability or low emissions. From this, industrial-policy narratives have emerged where government explicitly picks winners (and occasionally losers) via direct support for particular technologies or industries. This central-planning bias has notably manifested itself in federal and state procurement mandates and subsidies, including some tax preferences.

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[1] Oil is a fungible, global commodity. In contrast, natural gas is not nearly as transportable. The differences in transportation costs mean more variation in natural-gas pricing between countries and even within regions of the United States.

[2] For example, see Paul Joskow, "Natural Gas: From Shortages to Abundance in the United States," American Economic Review, Vol. 103, No. 3, pp. 338-43, May 2013. https://www.aeaweb.org/articles?id=10.1257/aer.103.3.338

[3] Philip R. O'Conner and Eric M. O'Connell-Diaz, "Evolution of the Revolution: The Sustained Success of Retail Electricity Competition," COMPETE Coalition, July 2015. https://www.hks.harvard.edu/hepg/Papers/2015/Massey_Evolution%20of%20Revolution.pdf

Technology policy narratives are typically detached from firm economic principles and sound scientific evidence. Industrial policies undermine market performance. They inherently result in greater economic costs and political disputes over the "right" technologies, leading to politically vulnerable and unstable policies.

Congress has an opportunity to take major strides in pursuing a politically durable and economically rewarding policy framework. That means truly leveling the competitive playing field and enhancing market performance to the benefit of the economy and environment. That recipe largely boils down to encouraging wholesale-electricity-market reforms that enhance competition, reduce unnecessary regulatory burdens, tighten and improve public energy expenditures and phase out distortionary tax preferences. This will improve environmental quality, reward innovative companies and lower customer bills while expanding their choices. It also places the United States on a more fiscally responsible pathway.

Rationales for energy tax preferences and public expenditures

Market failures present an economic rationale for policy intervention to improve market performance. Interventions not aimed at correcting market failures lack economic merit altogether. The presence of a market failure merely presents an *opportunity* for policy intervention to improve market functionality. Even benevolent interventions often unintentionally undermine market performance. In many cases, interventions use policy instruments—including tax preferences and direct expenditures—that are poorly suited to correct for a particular type of market failure.

Energy security

Energy security is a nebulous concept linked to several different claims of market failure. I will focus my attention on the continuity of physical energy supply and the economic ramifications of price spikes. The first consideration is whether fuel imports put U.S. military readiness and economic activity at risk of fuel shortage. This is only minimally applicable to the electricity and natural gas industries, which rely overwhelmingly on domestic fuel sources and Canadian imports, but may be of concern in the oil industry. In 2015, the United States imported 24 percent of the oil it used, the lowest proportion since 1970, but still a substantial sum.[4]

Economic evidence from oil markets suggests that concerns over physical oil supply shortages are overblown. The global oil market is highly integrated, with fungible flows.[5] Even when one supply line is disrupted, supplies remain available from alternate sources or countries. During the 1973 Arab Oil Embargo, which cut the United States and allies off from some Arab supplies, oil was readily available on the international market. Government intervention—specifically, price ceilings—caused the oil shortages and gas-station lines, not any physical inability to obtain oil on the international market.

The second interpretation of energy security suggests supply disruptions in the global oil market leave the United States exposed to the adverse macroeconomic effects of price shocks. This means U.S. oil dependence, regardless of import share or volume, creates economic vulnerability.[6] The economic costs of oil dependency may present a market failure through the exercise of market power by the Organization of Petroleum Exporting Countries (OPEC) cartel, which elevates prices above competitive levels.[7] Price shocks in oil markets, however, are on the wane. Global oil demand projections have substantially softened over the last decade and vast exploitable oil reserves—particularly in the United States and Canada—have forced down international oil prices and served to mute OPEC's influence. Today, the U.S. fracking industry responds swiftly to any attempts by OPEC to raise global prices. Furthermore, many large oil consumers enter long-term oil price agreements to hedge volatility risk.

This presents a weak case for subsidizing domestic oil development. There is no plausible case to subsidize natural gas and primary fuels for electricity generation on grounds of energy security. Altogether, this does not warrant further discussion on tax incentives or direct expenditures to correct for energy-security concerns.

Principal-agent problems and information deficiencies

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[4] Energy Information Administration, "How much oil consumed by the United States comes from foreign countries?" March 8, 2016. http://www.eia.gov/tools/faqs/faq.cfm?id=32&t=6

[5] Joel Darmstadter, "Energy Independence: Fantasies, Facts, Options," Resources for the Future, November 2006. http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-IB%2006-02.pdf

[6] Ibid.

[7] David L. Green, "Measuring energy security: Can the United States achieve oil independence?" *Energy Policy*, Vol. 38 (4), April 2010. http://www.sciencedirect.com/science/article/pii/S0301421509000755

Energy consumers often run into the principal-agent problem, where one party (the agent) makes decisions on behalf of another party (the principal). This creates a potential market failure when the incentives of the agent differ from those of the principle, causing the agent to fail to account for the principal's interests. This commonly arises when property owners incur the costs of making energy-efficiency investments, but tenants receive the benefits in energy savings (if they are responsible for covering utility bills). This may cause property owners to underinvest in energy efficiency, unless they can recover the benefits of the investment some other way (e.g., rent premium). Conversely, tenants may overconsume energy if the property owner is responsible for paying utilities.

Energy consumers also have information deficiencies that adversely affect their decisions. For example, property owners sometimes do not understand the full value proposition of an energy-efficiency investment. Some studies suggest this contributes to consumers having an implicitly high rate of return that leads to underinvestment in energy efficiency. This deters consumers from making such investments, given their high upfront cost and long payback period.

Tax instruments are poor tools to address principal-agent problems and information asymmetries. They do not address the cause of the underlying market failures (misaligned incentives and incomplete information), just the symptoms. A policy instrument better equipped to address these causes would be information disclosures. Tax incentives are also blunt instruments, poorly suited for the case-specific nature of principal-agent and information problems. Many recipients of tax incentives would have undertaken the investment without the incentives, which raises the costs to achieve the policy objective.[8] Consumers' increased abilities to self-educate, especially in the digital age, often goes overlooked, as well.

Pollution externality

An externality results when two parties in a transaction fail to consider the benefits or costs imposed on a third party. This results in an overproduction/consumption of the product associated with a costly externality and underproduction/consumption of a product with a beneficial one. Air pollution is a

[8] Gilbert E. Metcalf, "Tax Policies for Low-Carbon Technologies," *National Bureau of Economic Research*, June 2009. https://core.ac.uk/download/pdf/6716337.pdf

prevalent example of a negative externality in the energy field, where the parties buying and selling the power do not account for the effects on human health and the environment. Pricing negative externalities (e.g., pollution tax) is the most economically efficient policy, but policymakers often find the approach politically impractical.[9] The focus then shifts to whether alternative policy interventions would provide more benefit than harm.

The portrayal of subsidies for clean energy as nearly equivalent to pricing pollution externalities is very problematic, as the underlying market failure is underpricing of pollution, not overpricing of clean energy.[10] In theory, subsidies, as a mirror image of taxes, can provide incentives to reduce emissions. In practice, they often promote economically inefficient and environmentally unsound actions.[11] Targeted tax preferences for clean energy are a form of industrial policy with potential environmental co-benefits, which is very different from an economical approach to environmental policy.

Knowledge spillovers

The creation of knowledge by one entity can benefit others. Individual companies cannot capture these spillover benefits for themselves (i.e., a positive externality). This results in the private sector having insufficient incentive to develop and deploy new technologies.[12] The main channels of knowledge creation are research and development (R&D) and learning-by-doing. Learning-by-doing occurs when early production of a technology creates new information that reduces the cost of future production.

Energy R&D has large spillover benefits, whereas those for learning-by-doing are typically quite small.[13] At the same time, waiting to adopt technologies with rapidly declining costs also has benefits (i.e.,

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[9] Severin Borenstein, "The Private and Public Economics of Renewable Electricity Generation," Energy Institute at Haas, December 2011. https://ei.haas.berkeley.edu/research/papers/WP221.pdf

[10] Ibid.

[11] Robert N. Stavins, "Experience with Market-Based Environmental Policy Instruments," Resources for the Future, November 2001. http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-01-58.pdf

[12] Adam B. Jaffe, et al., "A tale of two market failures: Technology and environmental policy," *Ecological Economics*, Vol. 54 (2-3), August 2005. http://www.sciencedirect.com/science/article/pii/S0921800905000303

[13] For example, see Carolyn Fischer, et al., "Environmental and Technology Policy Options in the Electricity Sector: Interactions and Outcomes," Resources for the Future, December 2013. http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-13-20.pdf

procuring the technology at lower cost in the future). In some energy-technology scenarios, the benefits of learning-by-waiting may outweigh the benefits of learning-by-doing.[14]

Research suggests that overcoming knowledge spillover effects presents a clear case for public R&D support, but remains unclear on intervention to support large-scale deployment.[15] Policy options to address R&D spillovers include tax preferences, direct payments and the creation of government programs (i.e., Department of Energy) that provide research and other industry support.

Effects of energy tax preferences and public expenditures

The effects of energy tax preferences and public expenditures depends on their magnitude and form. The Congressional Research Service estimated that, between 2015 and 2019, the cost of energy tax incentives was $21.5 billion for fossil fuels, $46.5 billion for renewables and $3.1 billion for energy efficiency.[16] The production tax credit (PTC), investment tax credit (ITC) and Section 1603 grants comprise the vast majority of energy tax incentive costs for renewables. Capital cost recovery dominates fossil-fuel tax provisions.[17]

Distinguishing targeted preferences from cost recovery

Generally, expanding the ability to recover legitimate business costs boosts economic growth. Most fundamental tax-reform proposals move the code toward more rapid depreciation of such expenses, or the ability to write them off fully, in pursuit of a tax climate that does not penalize a business for investments in research or capital. From a growth and neutrality perspective, the tax code would ideally allow all businesses, in all industries, to recover their costs and face taxation only on their net income.

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[14] William W. Hogan, "Clean Energy Technologies: Learning by Doing and Learning by Waiting," seminar, September 2014. https://www.hks.harvard.edu/m-rcbg/cepr/Hogan_LBD_Overview_092914%20(2).pdf

[15] National Academies of Sciences, Engineering, and Medicine, *The Power of Change: Innovation for Development and Deployment of Increasingly Clean Electric Power Technologies*, The National Academies Press, September 2016. https://www.nap.edu/catalog/21712/the-power-of-change-innovation-for-development-and-deployment-of

[16] Molly F. Sherlock and Jeffrey M. Stupak, "Energy Tax Policy: Issues in the 114th Congress," Congressional Research Service, June 2016. https://fas.org/sgp/crs/misc/R43206.pdf

[17] Fossil-fuel tax preferences fall into three categories: 1) subsidizing extraction of high-cost fossil fuels; 2) encouraging investment in cleaner fossil fuels or non-petroleum options; and 3) enhancing capital-cost recovery.

In contrast, many technology-specific tax credits and payments (such as refundable credits or outright subsidies) act as targeted production and investment subsidies, instead of allowing for legitimate cost recovery. For example, fossil and renewable tax credits are industry-specific production preferences intended to reduce the cost of operation through the tax code. Generally, targeted tax credits are inefficient at promoting economic growth.[18] Moreover, such tax preferences are generally poorly suited to correct pollution externalities, principal-agent problems and information deficiencies.

Some energy-related tax preferences have beneficial cost recovery structures, especially those that permit immediate expensing. Expensing is preferable to depreciation, the default treatment of capital investments, which raises the cost of capital by dragging out the time period over which a business can reduce the tax hit associated with a given investment. Among common tax-reform options, full expensing results in some of the largest economic growth gains per dollar of federal revenue foregone.[19] The tax code's treatment of energy production includes many disparate, industry-specific provisions that create a complicated playing field. Uneven application can distort competitive relationships between industries and sets of technologies. Moving toward uniform expensing treatment across energy industries and technologies would mitigate these distortions and ensure vibrant competition, absent political manipulation.

Cost-effectiveness

Current tax preferences are not cost-effective policies to reduce pollution. Modeling studies have found, at best, a small effect of subsidies on reducing greenhouse-gas emissions, while in some cases increasing emissions.[20] The emissions that renewables displace are highly sensitive to regional and subregional electric fuel-mix patterns. For example, wind generation in areas with high nuclear and hydroelectric generation will not displace emissions as effectively as in areas with high fossil-fuel generation. Uniform tax preferences fail to account for this, whereas an emissions tax would efficiently build pollution costs into subregional power-dispatch decisions.

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[18] Joint Economic Committee, "The Inefficiency of Targeted Tax Policies," April 1997. https://www.jec.senate.gov/public/_cache/files/fe2eafaa-f355-462f-b515-15ad4a8f5e74/the-inefficiency-of-targeted-tax-policies-april-1997.pdf

[19] Tax Foundation, "Options for Reforming America's Tax Code," 2016. https://files.taxfoundation.org/legacy/docs/TF_Options_for_Reforming_Americas_Tax_Code.pdf#page=84

[20] Brian C. Murray, et al., "How Effective are U.S. Renewable Energy Subsidies in Cutting Greenhouse Gases?" *American Economic Review*, Vol. 104 (5), May 2014. https://www.aeaweb.org/articles?id=10.1257/aer.104.5.569

Existing policies, regulatory environments and market conditions affect the incremental costs and benefits of tax preferences. State renewable portfolio standards (RPS), which mandate a minimum percentage of electricity generation from renewable sources, heavily drive renewables development. Renewable tax credits have peripheral effects on renewables investment by "lubricating the markets," but RPS policies remain the principle driver of renewable energy development.[21] This diminishes the incremental benefits of avoided pollution from renewable tax preferences.

This interplay with RPS policies contributes to how the costs of tax preferences for pollution reduction far outweigh the benefits. A National Academy of Sciences review concluded that production and investment tax credits for renewable electricity reduced carbon dioxide (CO_2) emissions at an average cost of $250 per ton.[22] This far exceeds most estimates of the benefits of avoided CO_2 emissions.[23] Furthermore, the displacement of emissions by renewable energy will generally decrease going forward as the electric fuel mix becomes cleaner, which will drive avoided pollution costs upward.

Picking winners through the tax code is also problematic in promoting energy innovation. Tax preferences steer the private sector to invest in government-preferred technologies, rather than pursue the most productive use of capital to drive innovation. It also deters R&D in new technologies, as prospective developers may find it harder to compete with incumbents receiving preferential treatment.[24] Rather, changing the code to allow expensing of R&D costs would provide a relatively efficient and technology-neutral method to advance innovation.

Proponents of the "infant industry argument" suggest that public policy, including tax treatment, should be partial to new technologies to provide protection through their developmental stages. Preferential treatment raises a host of problems, including policymakers' inability to know when to end industry protection (or how much to provide) and the creation of "rent-maintenance" behavior, where the infant

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[21] Todd Bessemer and Francis X. Shields, "Resource Investment in the Golden Age of Energy Finance: Financial Investment Drivers and Deterrents in the Competitive Electricity Markets of the U.S. and Canada," ISO/RTO Council, May 2015. http://www.isorto.org/Documents/Report/201505_IRCResourceInvestmentReport.pdf
[22] National Research Council, *Effects of U.S. Tax Policy on Greenhouse Gas Emissions*, National Academies Press, 2013. www.nap.edu/catalog/18299
[23] For example, the Environmental Protection Agency recently estimated the damage of one ton of CO_2 to be between $40 and $60.
[24] Joint Committee on Taxation, "Present Law and Analysis of Energy-Related Tax Expenditures," June 9, 2016. https://www.jct.gov/publications.html?func=startdown&id=4915

industry seeks continued partial treatment after maturity.[25] History suggests that direct subsidies and tax exemptions for energy innovation continue well after targeted technologies have matured.[26] Furthermore, the inconsistent application of temporary tax preferences has caused inefficient investment behavior, such as the boom-bust cycles of wind development in response to periodic PTC reauthorizations. Subsidies for energy innovation are most effective when they are predictable, contain an outcome or performance structure and include sunset provisions.[27]

Direct government support for energy innovation has a spotty record. Expanding government programs create opportunities for government failure, where the intervention creates inefficiencies that can outweigh the harm caused by the market failure. For example, government failure has been more persistent and costly than market failure with respect to alternative-energy development.[28] Government failure appears particularly pronounced in late-stage technology development involving complex project management. The Government Accountability Office and others have criticized the Department of Energy (DOE) extensively for poor management of large demonstration projects.[29]

Energy R&D funded by DOE has had mixed results, with a relatively high rate of technology transfer to the private sector.[30] Assessing the benefits of basic R&D is very challenging, but it presents the greatest opportunity to maximize public investment in energy R&D. In contrast, DOE's funding of technology demonstration projects in the late development stage has not been cost-effective.[31] Federal agencies do not have an advantage in lowering production costs.[32] DOE's performance indicates room for improvement in basic R&D and calls into question the role of the federal government in managing demonstration projects.

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[25] Devin Hartman "Wholesale Electricity Markets in the Technological Age," R Street Institute, August 2016. http://www.rstreet.org/wp-content/uploads/2016/08/67.pdf
[26] National Academies of Sciences, Engineering, and Medicine, 2016.
[27] National Academies of Sciences, Engineering, and Medicine, 2016.
[28] Peter Z. Grossman, "U.S. Energy Policy and the Presumption of Market Failure," *Scholarship and Professional Work – Business*, 2009. http://digitalcommons.butler.edu/cgi/viewcontent.cgi?article=1027&context=cob_papers
[29] Government Accountability Office, "Department of Energy: Consistent Application of Requirements Needed to Improve Project Management," May 2007. www.gao.gov/products/GAO-07-518
[30] Congressional Budget Office (CBO), "Federal Support for the Development, Production and Use of Fuels and Energy Technologies," November 2015. https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/50980-Energy_Support.pdf
[31] Terry M. Dinan, "Testimony: Federal Financial Support for Fuels and Energy Technologies," U.S. House Committee on Science, Space, and Technology Subcommittee on Energy," March 13, 2013. http://www.cbo.gov/sites/default/files/cbofiles/attachments/03-12-EnergyTechnologies.pdf
[32] CBO, 2015.

Economic studies indicate that the effectiveness of energy-efficiency policies is highly sensitive to the degree that customers undervalue energy efficiency.[33] The economic literature lacks consensus on the degree of undervaluation.[34] This underscores the difficulty in determining the efficient level of incentives for energy-efficiency investments and amplifies the likelihood that government failure outweighs market failure in contriving energy-efficiency tax preferences. Even the task of administratively identifying technologies and arranging programs cannot cover all energy-savings practices and will not meritoriously identify future technologies.[35]

Market distortions

Energy market distortions from tax preferences often go overlooked, but these unintended effects have growing consequences. In competitive electricity markets, investors' expectations of future market prices drive investment decisions. Policies that distort price formation in electricity markets cause inefficient operation of the electricity system and inefficient capital-investment decisions.

The PTC compensates recipients based on electrical output. Wind generators benefit the most from the PTC. Since wind generators have physical operating costs near zero, the PTC pushes their effective operating costs negative. This, along with renewable energy credits, results in some wind generators offering into wholesale electricity markets at negative levels.[36] In areas with high electric-transmission congestion, this can cause negative electricity prices. This artificially suppresses revenues to all generators, reducing their profit margins and creating grid operation challenges. This may also contribute to premature power plant closures or higher prices in electricity-capacity procurement.[37]

The ITC and Section 1603 grants, which provide one-time cash grants in lieu of tax credits, also distort capital investment decisions. The ITC and Section 1603 grants skew investment toward capital-intensive

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[33] Fischer, et al., 2013.
[34] Fischer, et al., 2013.
[35] Joint Committee on Taxation, 2016.
[36] Phillip Brown, "U.S. Renewable Electricity: How Does Wind Generation Impact Competitive Power Markets?" Congressional Research Service, November 2012. https://fas.org/sgp/crs/misc/R42818.pdf
[37] The downward pressure put on "real-time" energy-market revenues will put upward pressure on capacity-market revenues.

projects. This may encourage selection of lower-value projects with poor performance profiles (e.g., do not produce reliably).[38]

In states clinging to the regulated electric monopoly model, state public utilities commissions decide whether to approve investments proposed by utilities. In contrast to competitive markets, where investors incur and manage risk, the regulated model socializes investment risk on ratepayers. This means investment risk associated with tax preferences is borne by ratepayers, sometimes resulting in different investment decisions and poor risk management.

One example is the effect of the advanced nuclear power production credit. To qualify, a new nuclear facility must enter service by the end of 2020. The multibillion dollar value of the credit factored into state regulators' decisions to expand two nuclear facilities in Georgia and South Carolina. Construction delays have caused investors and credit rating agencies to doubt the projects' completion in time to qualify for the credit, with resulting costs likely shouldered, in part, by ratepayers. By comparison, an independent power producer would face the full investment risk of failing to qualify for the credit.

Distinguishing market enhancements from industrial policy

Economists overwhelmingly prefer technology-neutral policy instruments to correct for market failures like R&D spillovers and pollution. However, federal and state energy policies to date have tended to favor certain technologies or industries explicitly. This has resulted in an energy policy discourse dominated by what industries or technologies to advance, rather than how best to improve market performance.

Industrial policies have primarily emerged with a green tint, anchored by the proliferation of renewable federal tax preferences and state RPS policies. They have created entrenched interests and facilitated a culture seeking ongoing subsidization. Look no further than current tax preferences for renewable technologies that have long since matured.

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[38] Harrison Fell, Joshua Linn and Clayton Munnings, "Designing Renewable Electricity Policies to Reduce Emissions," Resources for the Future, December 2012. http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-12-54.pdf

The legacy of green industrial policy consists of unnecessary costs, modest pollution reductions and deepened political tensions. This led to calls for counter-industrial policy that seeks preferential treatment for technologies excluded from the initial green industrial policy agenda. Examples of this range from requests for bailouts for unprofitable nuclear plants to favorable tax treatments for cleaner fossil fuels.

Continued efforts to pick winners through the tax code contributed to the current patchwork of tax preferences working at cross-purposes. Tax preferences for environmentally damaging activities conflict with others for clean energy. Contradictions even exist between clean-energy provisions. Renewable energy preferences artificially depress power prices, leading to overconsumption and disincentives for energy efficiency.[39]

Meanwhile, fiscal circumstances have deteriorated. This places greater scrutiny on all budgetary considerations, including energy tax preferences and direct expenditures. However modest in the larger budget picture, energy policy discourse cannot lose sight of our escalating national debt.

Economic conservatives are wise to express skepticism of extensive tax preferences and direct expenditures for favored technologies. However, sometimes those opposed to poor government interventions misdirect their criticism of interventions, rebuffing the legitimate market failures such interventions aim to address. This raises inaccurate skepticism of the "disease" used to justify the "medicine" they oppose. The medicine of green industrial policy is harsher than the disease, but the best remedies to energy market failures are consistent with limited government principles. Competitive markets, with targeted market-based interventions to address externalities, provide the formula for a wealthier economy and healthier environment.

Fortunately, the model for energy success has become clearer. Competitive natural gas and electricity markets have created large cost savings, reduced emissions and spurred innovation over the past decade. Open electricity markets create pathways to voluntary, low-cost emissions reductions. A surge in consumer interest, both at the corporate and household levels, in buying clean energy has contributed to increases in "organic" clean energy growth in states that permit electric customer choice.

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[39] Borenstein, 2011.

It has also led to demands for electricity consumers to choose their electric provider in states that restrict it. Markets also create a competitive platform that rewards innovators and facilitates transitions to breakthrough technologies. Congress can improve these markets by leveling the tax field, reducing red tape, avoiding industrial policies, encouraging market-enhancing reforms at the Federal Energy Regulatory Commission (FERC) and supporting efficient complimentary R&D policies.

Takeaways and recommendations

Well-functioning competitive energy markets are the best choice for innovation, consumers and the environment. The United States cannot affordably mandate and subsidize its way to a clean energy future. Industrial policies increasingly subvert competitive energy markets and contribute to a mounting public debt burden. It is time to reawaken the markets.

Industries and technologies should excel based on their merits, not political popularity. Congress can steer U.S. energy policy back toward market principles, where competitive forces pick winners, not government. Several areas to begin include:

1. *Phasing-out distortionary energy tax preferences.* The emergence of a level tax field begins with eliminating investment and production tax credits and payments. These encourage increased production from government-preferred technologies and industries and do not expand legitimate cost recovery.
2. *Subjecting all energy tax provisions to objective criteria*. While the best course of action is to eliminate all tax preferences in favor of a cleaner code that allows broad-based cost recovery, Congress may instead pursue a course of more modest changes. Improvements to existing preferences should follow principled economic criteria, such as:
    a. Phase-out technology-specific preferences based on levels of deployment (e.g., a production level that achieves economies of scale).
    b. Avoid "picking winners" arbitrarily by making tax preferences technology-neutral (e.g., based on performance criteria).
3. *Equalizing beneficial tax structures*. Tax structures that permit greater cost recovery enhance economic growth. For example, full expensing of energy R&D costs would permit companies to invest in the most productive innovations, not government-preferred technologies. Differential

treatment in cost recovery for one industry or set of technologies can create competitive imbalances. Policy reforms may rectify this by broadening applications that enable cost recovery uniformly across industries and technologies.

4. *Aligning public R&D spending with spillover benefits*. Policy reform should emphasize basic R&D while scaling-back late stage (e.g., demonstration) project support. Additional good governance considerations include improved DOE program performance metrics, constant program reevaluation to determine when to phase-out government investment, stronger linkages to private sector needs and interests and scrutinizing expenditures in context of a constrained fiscal environment.
5. *Expanding the focus of "leveling the competitive playing field" to regulatory reforms*. Opportunities to cut red tape abound, from hydroelectric and advanced nuclear licensing to modernizing the Clean Air Act. Leveling the playing field also means removing artificial barriers to entry for unconventional technologies in wholesale electricity markets under FERC jurisdiction. Improving rules that affect electricity market price formation will also help stimulate efficient investments.

I will be happy to answer any questions.