

America's Energy Path Forward

BY PHILIP K. VERLEGER, JR.

*Break the hold of
established legacy firms.*

*Let innovation flourish,
and avoid an energy
“Groundhog Day.”*

Both Russia's 2021 effort to blackmail Europe by cutting natural gas supplies and the threat to Middle East oil supplies arising from Hamas's October 7 massacre of Israeli civilians are stark reminders of the world's need for energy security.

For the last fifty years, strategic stocks of petroleum and now natural gas have been the mechanism used to protect against such disruptions. That strategy has been a horrible mistake. The decision to continue relying on oil and natural gas instead of developing alternative sources of energy was an even more significant blunder. Global economic growth would be at least 10 percent and perhaps even 20 percent higher had the world moved past oil and gas fifty years ago. World poverty today would be less of a problem. Those who assert that the growth of economies for the next fifty years requires the continued use of oil and gas would assure us of a future even gloomier than the one now projected because the economic cost of the impacts of continued warming—including sea level rise, desertification, and more severe storms—will result in harsh reductions to global GDP.

Fifty years ago, in 1973, OPEC launched a five-month embargo on oil sales to countries that supported Israel after the Yom Kippur attack by Egypt and Syria. Oil prices skyrocketed, and the global economy entered a period of contraction. Events since 1973 have demonstrated that, during wars and revolutions, oil markets and now natural gas markets are subject to extreme fluctuations that have serious economic impacts.

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When war broke out between Iran and Iraq in 1980, spot oil prices rose by almost 100 percent. The increase worsened the global recession already started by U.S. monetary tightening.

The oil supply loss caused by the 2011 Libyan revolution boosted oil prices by 56 percent. A Japanese researcher calculated that the price increase cut GDP by

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small amounts in the European Union, the United States, and Japan, but by almost 1 percent in India and China.

Russia's actions limiting Europe's accumulation of natural gas inventories, followed by its invasion of Ukraine, caused a ten-fold rise in natural gas costs in Europe and a 30–40 percent increase in global crude prices. The European Bank for Reconstruction and Development estimated that EU growth was reduced by almost 1 percent.

As the end of 2023 approaches, we can only wait and see what impact the Israeli-Hamas war will have on energy prices and global growth. It is not too early, however, to conclude that the funds and efforts expended on energy security from 1973 to 2023 have provided no return on the investment. Fifty years ago, policymakers erred when they failed to instigate the rapid reduction or elimination of our dependence on oil and natural gas. They failed in this because they did not recognize the essential instability of Middle Eastern countries that hold a large share of global oil and gas reserves. Rather than moving away from oil, gasoline, and diesel, they chose instead—encouraged by the multinational oil companies and major banks—to fawn before and curry favor from the suddenly wealthy oil- and gas-exporting nations.

Energy security can only be achieved by abandoning or drastically limiting petroleum and natural gas use. A rapid move to renewables would protect the global economy from a destabilizing oil or gas supply disruption. Such a shift would also reduce oil and gas prices by 50–70 percent, impoverishing the Middle East governments that

directly or indirectly funded the recent terrorist incursions into Israel, not to mention the 9/11 attacks on New York and Washington, D.C.

In addition, abandoning oil and natural gas posthaste in pursuit of greater energy security would hasten the transition to a net-zero world. That transformation can be sped up by understanding the linkage between energy security and environmental protection.

Critical changes in the global economy—particularly the emergence, after financial deregulation in the United States, the United Kingdom, and Europe during the 1970s and 1980s, of new, large companies funded by venture capital—will make it possible to move off oil and natural gas and achieve energy security. This transformation will be slowed, though, by numerous regulatory hurdles, aided and abetted by the continued resistance of legacy energy firms, unless we take steps to limit such impediments.

LEGACY ROADBLOCKS

Established or legacy firms have historically been an impediment to economic innovation and the introduction of new technologies that clearly benefit humanity. Such progress accelerates only when legacy firms' control over access to the market, their ability to deny new entrants capital required to grow, their ownership of critical patents, or their dominance of policy is broken.

Legacy airlines such as American and TWA fought airline deregulation in the United States, as did the major

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legacy airlines in Europe. They succeeded for a time by denying new entrants access to gates or landing slots at major airports. However, in the end, low-cost Southwest and Ryanair became the largest domestic travel air carriers in the United States and Europe, respectively.

In 1970, AT&T was the legacy phone company in the United States, holding a market share that exceeded 90 percent of local and long-distance service. The company preserved its dominance by requiring anyone connecting to its system to purchase equipment produced at its plants. AT&T executives bitterly resisted regulatory changes that allowed the connection of equipment manufactured by other companies, such as phones produced in Japan. The firm's control over the market was broken when these limitations ended. AT&T closed its plants and research facilities as new entrepreneurs introduced new technologies such as cellular phone systems.

The energy industry has long been ruled by established oil firms such as Exxon and Shell, energy equipment suppliers, and large utilities. Politicians and energy policymakers in OECD countries turned to these firms

Nasty Business

Multinational oil firms for years were almost a law unto themselves, paying bribes, supporting revolutions, and destroying the environment in many places. They could do this because the world's biggest consuming nations, the United States included, put energy availability and security above the interests of citizens in the affected producing areas.

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following the 1973 oil market disruption to implement their efforts to increase energy security. They had no choice because no other companies had the capabilities needed to accomplish this task.

Not surprisingly, the legacy energy companies pursued “energy security” programs that strengthened their businesses and their market control. Despite being criticized for not moving more rapidly to develop renewable energy projects, they have maintained efforts to hold their market for fifty years even as concerns regarding global warming have increased. Indeed, the legacy companies have little interest in expanding in business areas that would eclipse their most profitable activities. Still, even today, politicians and policymakers turn to these firms to address energy security and global warming issues.

This reliance on established energy companies is not necessary today because other firms and entrepreneurs are prepared to replace them, just as legacy airlines and AT&T were replaced. This replacement has already happened in other sectors. Changes in financial regulation have created the opportunity for large new entrants such as Apple, Amazon, and Microsoft to displace their legacy company competition. One important shift was the dropping of limitations on the types of companies in which large retirement funds could invest. The new rule, which became effective in 1977, along with cuts in capital gains taxes, helped shift large sums from shares in old-line companies such as General Motors and Exxon to new companies like Tesla and Vestas sponsored by Silicon Valley venture capitalists.

The success of many new entrants into the energy sector has been slowed, though, by the ongoing resistance of legacy firms and by politicians who keep turning to legacy firms to resolve energy security and global warming issues. These established firms, like the legacy airlines mentioned above, have perpetuated old or erected new obstacles to the energy transition to preserve their business models and profit. For example, in Europe and the

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United States, the legacy oil companies have influenced governments to divert funds intended to boost electric vehicle charging into constructing hydrogen fueling stations, which will be used rarely due to the scarcity of hydrogen-powered vehicles. The diversion reduces the availability of charging and depresses electric vehicle demand.

REPEATING HISTORY

October 2023 marked the fiftieth anniversary of the 1973 Yom Kippur War and the Arab embargo on oil exports. The embargo and ensuing rise in global oil prices brought energy security to the forefront. Many policy decisions made by the United States, Japan, and most European Union governments have been guided since that time by the need to protect against oil price “shocks.” These policies initially led to programs that increased global use of non-oil energy sources, primarily coal, encouraged conservation, and created strategic crude oil inventories designed, theoretically, for use during supply shortages.

Such reactive energy policies have had several unintended impacts. The most egregious has been global warming. Harmful greenhouse gas emissions have been much higher than they would have been without the programs adopted after October 1973 to increase energy security.

The world has also become less safe because these policies empowered authoritarian regimes in countries endowed with large reserves of liquid hydrocarbons.

Energy security concerns as well empowered the world’s largest energy companies, primarily multinational oil firms, to act against society’s long-term interests. For years, these

companies were almost a law unto themselves, paying bribes, supporting revolutions, and destroying the environment in many places. They could do this because the world’s biggest consuming nations, the United States included, put energy availability and security above the interests of citizens in the affected producing areas.

Many of these mistakes cannot be undone. The Niger Delta, for example, has been permanently scarred and made almost uninhabitable by the companies developing oil there. Hundreds of square miles of the Gulf of Mexico have become a dead zone due to runoff from synthetic fertilizers manufactured using hydrogen derived from natural gas. However, such errors offer guidance for future economic and environmental policymakers that may help them avoid the fate famously pronounced by philosopher George Santayana: “Those who do not remember the past are condemned to repeat it.”

With this thought in mind, it is essential to look back at the critical mistakes of energy policies adopted in response to the 1973 crisis and use what we have learned to inform economic, environmental, and energy policies for the next half-century. Some of the mistakes are obvious. Others are not.

A TRUE SHOCK

The OPEC embargo on oil shipments to the United States, the Netherlands, Rhodesia, South Africa, and Portugal announced on October 17, 1973, accompanied a cut in OPEC production that shocked the United States to a magnitude exceeded only by Japan’s attack on Pearl Harbor in 1941. Three weeks after the OPEC announcement, U.S. President Richard Nixon described the dimensions of the emergency in an address to the nation.

In his speech, Nixon warned of heating oil and gasoline supply shortfalls. To lessen the immediate impact, the government ordered airlines to cut schedules, lowered speed limits, and commanded utilities that could switch

“Groundhog Day”

During and after the 2021 crisis, governments of major industrialized countries have again turned to legacy energy firms to improve energy security. The legacy companies—in this case, multinational oil companies—are, in turn, relying on unstable governments led by autocrats for their supplies. By relying on oil majors such as Shell and Total, the European Union may also be compromising its efforts to eliminate net greenhouse gases by 2050.

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from oil to coal to do so. The administration also proposed relaxing environmental regulations temporarily, case by case, to boost energy supplies from non-oil sources.

Nixon then called for the nation to turn away from international trade to address its energy needs: “Let us pledge that by 1980, under Project Independence, we shall be able to meet America’s energy needs from America’s own energy resources.”

THE U.S. MARCH TO ENERGY INDEPENDENCE

The energy independence Nixon described could have been achieved by boosting domestic supply or reducing domestic consumption. His administration—and most administrations that followed—chose the first option.

Encouraged by legacy oil and gas companies, the United States focused on expanding the development of domestic fossil fuel resources, building strategic oil reserves, promoting domestically produced plant-based fuels that could substitute for oil, encouraging greater coal use, and, to a limited extent, implementing longer-term conservation programs. The obvious economic approach, raising prices to promote conservation, was eschewed at every opportunity.

The United States was not alone in taking these steps. Other developed countries also established strategic stocks and boosted fossil fuel substitution—primarily coal—for oil, again encouraged by established energy firms.

Market Capitalization of the World's Largest Automakers (billions)	
Tesla	\$765
Toyota	\$306
Porsche	\$85
BYD	\$82
BMW	\$69
Mercedes	\$68
Stellantis	\$63
Volkswagen	\$58
GM	\$43
Ford	\$42
Source: Yahoo! Finance.	

Energy security ceased to be a concern for much of the world after 1983 as oil prices fell. The word “energy” does not appear in the 1985 or 1986 G7 declarations. The Nixon idea of energy independence remained in “hibernation” until President George W. Bush was inaugurated in 2001. Bush appointed his vice president, Dick Cheney, to lead a task force on energy. Cheney’s report returned to the Nixon and Ford themes, calling for expanded oil drilling and greater coal use.

Five years later, in his January 2006 State of the Union address, President Bush said bluntly, “We are addicted to oil,” and then announced his intention to

replace 75 percent of U.S. oil imports from the Middle East with ethanol or other energy sources. Among other things, he called on the United States to convert more agricultural products into fuel to replace oil imports. Conservation went unmentioned.

In November 2019, almost forty-six years after President Nixon called for energy independence, the United States achieved it as our crude oil and petroleum product exports equaled our imports. Meanwhile, the United States had become a net exporter of natural gas and coal.

We gained this independence thanks to fracking, the technological breakthrough that boosted U.S. oil production from 2008 to 2022 by 163 percent and natural gas output by 80 percent.

Fracking succeeded primarily thanks to the efforts of private independent oil companies, not the established firms that by 2000 had abandoned drilling in most of the United States. The success of these new companies, in turn, rested on the development of financial instruments, futures in particular, that enabled them to hedge production, just as producers of agricultural goods and other ma-

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terials hedge. Neither development received support from the oil industry or the government. Indeed, the large companies dominating electricity, natural gas, and petroleum production bitterly opposed the futures market’s creation. In short, U.S. energy independence occurred despite, not because of, their efforts.

The independents’ success in fracking shale altered history. U.S. oil and gas production, which had been in decline, surged back. These companies overcame barriers to innovation created by the large legacy firms in the oil industry that dominated the business in 1973 and for decades later. Key structural changes in the U.S. economy made it possible to fund and expand the companies that developed fracking.

Financial deregulation, especially the 1977 amendments to the “prudent man” rule of the Employment Retirement Income Security Act of 1974 (ERISA), created a way for new entrants to obtain the capital required

to compete with legacy companies. The rule had required trustees of retirement funds to set “standards to protect private pensions and health plans.” Among other things, trustees were instructed to avoid speculation and to consider probable income and “probable safety of capital to be invested.”

The “prudent man” amendment and other measures had a tremendous impact on those who controlled investment in innovative startups and how much funding was available to such firms. The loosening of the “prudent man” rule, in particular, helped make the creation of companies such as Apple and Tesla possible.

THE KEY ROADBLOCK TODAY

For decades after the 1973 Arab oil embargo, the large legacy companies in the oil, automotive, and electric generation industries used their market dominance and political influence to frame the energy security debate. Not surprisingly, the programs they endorsed involved the continued use of fossil fuels, especially oil, natural gas, and coal. For example, despite the negative market impacts of the 1973 embargo, the 1979 Iranian revolution, and Iraq’s 1980 invasion of Iran, oil industry firms continued to explore and develop projects in countries led by unsavory, insecure, and often unfriendly autocrats. Large legacy utilities were undeterred from building more and more fossil-fuel-powered generating plants. Rather than focus on developing alternative non-oil power-train technologies, the automakers stuck to developing new internal combustion engine models and even, in several cases, cheating on emissions standard requirements to improve performance.

Through the oil industry’s influence and government shortsightedness, the chief energy security solution for oil supplies became taxpayer-funded emergency stockpiles, the so-called “strategic petroleum reserves.” The failure of the policies is illustrated by the oil price fluctuations between \$140 and minus-\$38 since 2000.

Europe’s illustrated exposure to Russian whims regarding its natural gas supply and the economic recession that followed Russia’s invasion of Ukraine confirm the absence of global energy security today. When the Soviet Union collapsed, legacy multinationals such as ExxonMobil and BP rushed to invest there. Ignoring the country’s politically chaotic history, they saw only the riches in oil and gas. They also encouraged

Carnage in the Afternoon

On Monday, April 20, 2020, the May WTI futures price fell as low as minus-\$40.32 per barrel. April 20 was the second-to-last day of trading for the May contract. A group of Bloomberg reporters dissected the collapse, describing what went on that day:

On that afternoon, with trading volumes thin and sellers outnumbering buyers, the trading-at-settlement contracts quickly moved to the maximum discount allowed, of 10 cents per barrel. For a period of around an hour, from 1:12 p.m. until 2:17 p.m., trading in these contracts all but dried up. There were no buyers.

On Friday, April 17, the prior trading day, open interest in the May future was 148,593 contracts on the CME NYMEX exchange, implying that 148 million barrels of oil would be delivered in Cushing, a facility with capacity for only 76 million barrels and already 60 percent full. As the Bloomberg article explained,

Futures contracts are settled by physical delivery, and if you happen to get stuck with one when it expires, you become the owner of 1,000 barrels of crude. Rarely does it come to that.

Furthermore,

The physical settlement for the benchmark WTI takes place at Cushing, Oklahoma. When storage tanks there fill up, the price on the expiring contract can plunge and become disconnected from the global market.

On April 20, few traders were willing or able to take physical delivery when the May settlement was posted. “The result was the carnage of that afternoon. At 2:08 p.m., WTI turned negative. And then, minutes later, sank to as low as minus \$40.32 before rebounding slightly at the close.”

In the aftermath, those remaining in the market who were theoretically obligated to take delivery were paid by those delivering the oil. When criticized by oil producer Harold Hamm, Terry Duffy, the CME’s CEO, said the following to CNBC:

“If Hamm or any other commercials believe that the price should be above zero, why would they have not stood in there and taken every single barrel of oil if it was worth something more? The true answer is it wasn’t at that given moment in time.”

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European nations, especially Germany, to rely more on Russian energy supplies.

Russian President Vladimir Putin attempted to exercise his leverage over Europe by limiting natural gas supplies to the region in the fall of 2021. His actions caused historic price increases and stunted Europe's recovery from its covid-related recession. It took huge fiscal stimulus packages from individual governments and the European Union to stave off another downturn. Germany's aid amounted to more than 7 percent of the country's GDP. Such were the costs of Europe's energy security failures.

During and after the 2021 crisis, governments of major industrialized countries have again turned to legacy energy firms to improve energy security. The legacy companies—in this case, multinational oil companies—are, in turn, relying on unstable governments led by autocrats for their supplies. By relying on oil majors such as Shell and Total, the European Union may also be compromising its efforts to eliminate net greenhouse gases by 2050.

Meanwhile, political unrest in the Middle East reminiscent of the Arab Spring is reemerging among the poor in the rapidly expanding populations. The positive response to the Hamas attack demonstrates wide support for political change. The governments of wealthy Middle Eastern nations such as Qatar and Saudi Arabia are strenuously resisting such pressure from other Middle Eastern countries and their own citizenry as they try to preserve oil's role in the global economy. However, as history shows, these forces sometimes cause sudden changes in government and oil and gas availability.

Real energy security then can only be achieved when oil and gas use is curtailed to the point where world consumers no longer depend on unstable, autocratic nations such as Russia for fossil fuel supplies. This also suggests that the interests of realizing true energy security and eliminating global warming (greenhouse gases) coincide.

CURBING CLIMATE CHANGE

As I assert above, energy policymakers in 2023 must avoid past mistakes. They must make a concerted effort now to reduce world oil and gas consumption. Doing so will be a vast step toward slowing and eventually stopping global warming.

The automobile sector will lead the transition away from oil as electric cars and trucks quickly replace internal combustion engine vehicles powered by gasoline and diesel. The changeover will come rapidly despite sluggish sales and widespread doubts about the ability of electric vehicles to compete with internal combustion vehicles in terms of price, available “refueling” infrastructure, and time-consuming recharging.

The decline in electric vehicle purchases in recent months is temporary. Chinese automaker BYD became the world's tenth-largest auto firm in 2022. It is also a leading electric vehicle manufacturer and is pushing hard to boost its electric vehicle sales. It has announced plans to build a plant in Hungary, where it intends to produce a €25,000 electric vehicle.

Tesla reacted to the BYD news by indicating it would produce a €25,000 electric vehicle at its Berlin factory. Tesla CEO Elon Musk made this announcement at a meeting during which Tesla moved to bring its German salaries in line with those of other German auto firms.

The aggressive steps by BYD and Tesla highlight the difference between 1973 and 2023. Legacy firms dominated the energy, automobile, and utility sectors fifty

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years ago. In 2023, new auto entrants such as BYD and Tesla dwarf the legacy firms in market capitalization, as the table here illustrates. Their price cuts will drive the transition to electric vehicles and could force many older, established firms into bankruptcy.

Consumers will replace traditional internal combustion vehicles with electric vehicles as prices fall, assuming electricity suppliers can meet electric vehicle charging needs. The shift, though, could be slowed by another legacy sector: utilities.

DRASTIC REGULATORY REFORM

We cannot protect ourselves from geopolitical energy market disruptions or minimize harmful greenhouse gas emissions without significant regulatory reform. The entrenched legacy firms that produce oil, natural gas, coal, and electricity know they can perpetuate their business models by using existing governing programs to delay or stop changes that would improve energy security and/or reduce harmful emissions more quickly.

The situation in California illustrates the problem. California utilities have resisted efforts by consumers to install electricity-producing solar panels on their homes, panels that could be used to help charge electric vehicles. Among others, the *New York Times* noted the economic impediments erected to block solar power expansion in the state.



*Federal and state officials, labor unions, and contractors were represented at the TransWest Express project's ceremonial groundbreaking on June 20, 2023, including U.S. Energy Secretary **Jennifer Granholm**, U.S. Interior Secretary **Deb Haaland**, and Wyoming Governor **Mark Gordon (R)**.*

The utilities want to charge solar panel owners who earn credits more because the “credit system, known as net metering, is not fair to people without solar panels who are left to bear the cost of operating the grid.” While understandable, this resistance to solar slows its adoption and, indirectly, boosts internal combustion vehicle and oil sales.

Similarly, an obscure U.S. maritime law, the Jones Act, has helped block the construction of a huge offshore wind farm, equivalent in size to two nuclear plants, that would have supplied 2.2 gigawatts of clean electricity to charge electric vehicles and light homes. The Jones Act stipulates that only U.S.-flagged ships can transport goods within the United States. Currently, the available wind turbine installation vessels in the world are foreign-flagged, and construction on the first U.S.-built vessel, the *Charybdis*, has faced delays.

The Jones Act is just one of the many legal and regulatory barriers affecting energy and environmental policies in the United States and other countries. For example, the construction of the necessary infrastructure to move electricity from ideally situated renewable power plants to consumers is constrained by the difficulty in obtaining permits to cross private land. In Europe, a wind farm in southwest France faces an eight-year wait to be connected to the grid. In the United States, an effort to build the TransWest Express power line, which would link a wind farm in Wyoming to the Nevada and southern California power markets, was blocked by a single landowner in Colorado. The line was first proposed in 2007. Construction did not begin until June 2023.

Barriers to Progress

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Thousands of other major and minor regulatory blocks exist that, if not corrected, will slow progress toward eliminating oil use and slowing, stopping, or reversing climate change. In some cases, such as with utilities, the changes will impose large financial losses on investors unless compensation is offered. In other cases, changes will be delayed due to obstructions erected by legacy fossil fuel industry companies.

These issues must be corrected quickly. Established legacy firms, though, will do their best to slow progress.

Removing regulatory hurdles will allow innovative firms funded by venture capitalists to introduce new technologies that serve the function previously served by oil, gas, and coal but without greenhouse gas emissions. These energy forms or conservation methods will speed up the decline in harmful emissions. Given recent history, the exact nature of these innovations cannot be predicted.

One can only be sure that new ideas will be forthcoming if we remove the roadblocks to innovation.

The regulatory changes must, though, promote entry and new concepts and not scupper programs that have helped limit pollution, protect the environment, or promote conservation measures such as improved automobile fuel economy. Specifically, they should focus on the controls outside the areas of the environment, energy use, health, and safety that are slowing or stopping progress toward reducing fossil fuel use.

The successful development and commercial scaling of some innovations will require substantial government funding. However, U.S. officials have been lousy at picking winners. Fifty years ago, the United States invested almost \$2 billion in the fast breeder reactor program (\$9 billion at 2023 prices) and almost \$1 billion in the Synthetic Fuels Corporation (\$3 billion in 2023 prices). These investments returned nothing. Many subsequent efforts by governments to support new energy projects have also failed.

Far greater success in innovation occurs when governments remove regulatory barriers to entry and allow new ideas and companies to flourish. Here, the lesson from the telecommunications industry is important. It was the Federal Communications Commission's decision to force AT&T to open its network connections to devices built by firms outside the AT&T family that gave the cellular phone industry the opportunity to grow, culminating in Apple's phenomenal success. More recently, the ability to play videos on phones, tablets, and other devices through internet sources such as YouTube has broken the monopoly of the cable television industry and major television networks.

Regulatory changes that enabled entrepreneurs to tap deregulated capital markets facilitated these developments. Likewise, the removal of regulations that limit the expansion of new energy businesses, combined with the capital offered from the same financial markets, will accelerate our progress toward energy security and emissions reductions.

These programs must also be designed so that the public utilities providing electricity to consumers can survive. This problem has been highlighted by the difficulties of dealing with the California utility PG&E, whose mistakes have caused forest fires that resulted in fatalities. California's regulators have worked to assess penalties on the firm without putting it out of business. Regulators across the world face the challenge of promoting rapid change while creating circumstances that enable regulated utilities to remain in operation.

Removing trade barriers is equally important. China produces the lowest-cost solar panels in the world and

dominates electric vehicle battery production. The United States and the European nations are erecting tariff barriers to limit the imports of Chinese batteries and solar panels. These actions decrease energy security and will increase

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emissions of global warming gases while failing to create new jobs and investment in high-tech industries that will strengthen economies. Trade barriers for imports of low-tech manufactured goods that will replace fossil fuels should be discouraged.

Many other policies are in place in every country that decrease energy security by favoring fossil fuels over renewable energy sources, policies defended by established businesses and government policymakers. These policies should be identified and scrapped wherever possible.

Energy environmental policies for the remainder of the twenty-first century should focus rigorously on removing the barriers erected by established businesses that promote fossil fuel use. A successful effort will speed the transition to a world with no net emissions of global warming gases while simultaneously ending the leverage that some oil-producing countries have used to squeeze and even terrorize developed economies.

Tesla and BYD's success in breaking the hold of established automobile producers on the choices offered to consumers demonstrates the power of deregulation, and the opening of financial markets to entrepreneurs shows that the goals of improving energy security and reducing global emissions are achievable by breaking the grip of legacy firms. The experience in autos should be repeated across the global economy. ◆