

9 transformative policies to promote energy abundance and reduce climate danger in America

By Alex Epstein (confidential — do not share without permission)

Introduction: America's energy crisis

America and the world are bringing about an escalating energy crisis, with dire economic, humanitarian, and security consequences, due to a fundamentally flawed climate policy: trying to reduce climate danger by attacking the production and use of fossil fuels in America.

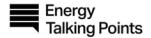
We were told for decades that if the government coerced Americans into rapidly eliminating fossil fuels, 1) the rest of the world will follow suit, causing CO2 emissions to rapidly decline; 2) we would not suffer any adverse energy, economic, or security consequences, given the ability of alternatives, especially solar and wind, to rapidly replace fossil fuels—whereas if the world failed to reduce fossil fuels, we would see 3) dramatic increases in climate danger due to 4) extreme climate changes that we wouldn't be able to adapt to.

None of this has occurred. U.S. efforts against fossil fuel production and use have 1) not caused global reduction in emissions: global emissions have increased, especially in China, which has 300 new coal plants in the pipeline; 2) even though reductions in the U.S. and Europe have been modest, the consequences have been disastrous, due to the current inability of favored solar and wind to replace fossil fuels, with consequences such as: major price inflation driven by higher energy prices, an increasingly unreliable grid, and Europe being at Russia's mercy for gas while America begs Saudi Arabia and Venezuela for oil. But despite increasing emissions, which we were told would lead to catastrophic climate danger increases, 3) global climate danger is at an all-time low, with a 98% decline in climate-related disaster deaths over the last century, in large part because of our increasing ability to neutralize climate danger, but also because 4) continuing rising CO2 levels, which have been rising for over a century, have not created unprecedented and overwhelming climate changes but rather modest challenges we have been able to master.

Thus, today's policy toward fossil fuels and climate has proven a total failure.

The fundamental problem with today's policy towards fossil fuels and climate is that it is biased, not balanced.

Instead of recognizing our limited ability to control global emissions, the unique benefits of fossil fuels, and our ability to master any climate changes from rising CO2, today's policy is so hostile and unbalanced toward fossil fuels that it seeks to deprive Americans of them even when other countries won't follow suit; it ignores the unique and enormous benefits of fossil fuels; and it catastrophizes the climate side-effects of fossil fuels. This must change.



The United States should carry out a truly balanced policy towards fossil fuels and climate based on four irrefutable principles of policymaking on this issue that today's disastrous "climate policy" fails to practice:

- (a) We should not make any policy with respect to the climate side-effects of fossil fuel use without recognizing that America, who emits only 1/7th of the world's CO2—a fraction that is decreasing—cannot directly control global CO2 emissions, and that so long as fossil fuel energy is uniquely affordable, reliable, versatile, and scalable, much of the world—especially the developing world—will continue to use fossil fuels regardless of what we do. Our most direct and humane ability to reduce CO2 emissions is through the use of our uniquely free society to innovate alternatives that can eventually match or surpass the economics of fossil fuels. Attempting to reduce global CO2 by harming our energy systems and thereby standard of living and security is a profoundly self-destructive form of symbolism.
- (b) We should not make any policy with respect to the climate side-effects of fossil fuel use without a full consideration of the unique general benefits of fossil fuel use that would be lost, including: an unrivaled ability to provide energy that is affordable, reliable, versatile (able to power every type of machine), and scalable (able to power billions of people in thousands of places)—and all the benefits that flow from that ability, including abundant food, clothing, shelter, medical care, and military capability.
- (c) We should not make any policy with respect to the climate side-effects of fossil fuel use without a full consideration of the unique climate mastery benefits of fossil fuel use, including: far greater availability of irrigation and crop transport to alleviate drought, far greater availability of air conditioning to neutralize heat danger, far greater availability of heating to neutralize cold danger, and far greater ability to produce resilient buildings, storm warning systems, and evacuation systems to neutralize storm danger. These climate mastery benefits of fossil fuels have thus far contributed to the staggering 98% decrease in climate-related disaster deaths over the last 100 years.
- (d) We should not make any policy with respect to the climate side-effects of fossil fuel use without a commitment to evenhandedness and precision. Evenhandedness requires considering not just negative climate side-effects of fossil fuel use (such as increases in heatwave intensity) but also positive climate side-effects of fossil fuel use (decreases in cold-related deaths and CO2 fertilization of crops and other plants). Precision requires refraining from understatement and (more common) overstatement of climate effects, such as media predictions of rapid sea level rises that have no basis in mainstream climate science.

Based on these principles, the only rational way to reduce climate danger is through a combination of energy abundance, climate mastery, and alternative energy innovation.



Summary: 9 transformative policies to promote energy abundance and reduce climate danger in America

To implement the four irrefutable principles of energy and climate policymaking, and to promote energy abundance and reduce climate danger in America, we recommend that the following policies be implemented. (More details to follow.)

- 1. The Federal Government should abandon all "net-zero" goals and targets for the American economy, including withdrawal from the Paris Agreement and the UNFCCC. The long-term strategy of the United States with regard to climate and energy that replaces the previous framework should be a pro-human-flourishing strategy of energy abundance, technology-based climate mastery, and energy innovation to ultimately create a truly economically superior alternative to the now dominant fossil-fuel-based energy system.
- 2. The Federal Government should abandon the so-called "whole of government approach to climate" and replace it with a strategy of energy freedom that will lead to energy abundance, increasing climate mastery, and genuinely cost-effective alternative energy sources.
- 3. The Environmental Protection Agency (EPA) should re-examine their Endangerment Finding using a balanced approach consistent with the irrefutable principles.
- 4. All agencies should ensure that discount rates in cost-benefit analyses and regulatory assessments reflect sound economic practices. In the case of speculative climate challenges, higher discount rates are appropriate given that the wealthier America and world of the future will be far more resilient to climate challenges than we are today.
- 5. All agencies should cease the direct or indirect use of emissions scenarios or other assumptions about global greenhouse gas emissions that are in line with a temperature projection of greater than 3°C above preindustrial levels by the year 2100 in regulatory analyses, environmental reviews, and benefit-cost assessments.
- 6. All agencies should review and update climate and energy research grants to properly value climate mastery and energy abundance.
- 7. The Federal Government should lead reform of the International Energy Agency and other international bodies of which the U.S. is a part that exhibit anti-fossil-fuel bias, in order to eliminate this bias and promote energy security and development in poor countries.
- 8. All agencies should conduct assessments about how to facilitate climate mastery, including in the realm of wildfire management, including identifying and to the extent possible resisting the destructive influence conservation and environmental advocates have on preventing life-saving wildfire measures.
- 9. All agencies should identify and assess regulatory barriers that hinder the development, deployment, and scaling of cost-effective alternative energy solutions.



1: Abandon "net-zero" and withdraw from the Paris Agreement and UNFCCC

If fully implemented, the goal of "net-zero" by 2050, to which the U.S. has made various commitments, would cause severe economic disruption, leading to widespread hardship and a significant decline in the quality of life for many Americans.

Accordingly, all federal departments and agencies should:

- (a) Identify all existing "net-zero" goals and targets, including any regulations, policies, or programs related to these goals.
- (b) Develop and execute a plan to abandon or revise all such "net-zero" goals. This plan should include an inventory of all relevant policies as well as a timeline for their revision or rescission.
- (c) Review any duplicative or conflicting rules related to net-zero goals and make adjustments to ensure consistency.

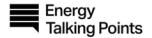
The President of the United States should immediately withdraw from the Paris Agreement on Climate Change. Accordingly,

- (a) The Secretary of State should provide formal notice of withdrawal from the Paris Agreement to the United Nations Secretary-General, in accordance with Article 28 of the Agreement. The withdrawal would take effect one year from the date on which the notice is delivered, or as otherwise stipulated in Article 28.
- (b) All federal agencies and departments should cease adherence to the Nationally Determined Contributions (NDCs) submitted as part of the Paris Agreement. This includes any actions, policies, or initiatives aimed at reducing greenhouse gas emissions in accordance with these contributions. Any regulations or guidance developed pursuant to the NDCs should be reviewed and, if necessary, rescinded or modified.

Further, the Secretary of State should submit the Paris Agreement to the United States Senate for consideration as a treaty, in accordance with Article II, Section 2 of the United States Constitution. Should the Senate reject ratification, it will be considered the final determination on the matter, and the Paris Agreement will be nullified with respect to the United States.

The United States should additionally begin the formal process of withdrawal from the UNFCCC in accordance with Article 25 of the Convention, which allows any Party to withdraw by giving written notification of withdrawal. Accordingly,

- (a) The Secretary of State should provide formal notice of the United States' withdrawal from the UNFCCC to the United Nations Secretary-General, in accordance with Article 25 of the Convention. This notice should be delivered as soon as practicable, and the withdrawal would take effect one year from the date of notification, as provided by Article 25.
- (b) The Administrator of the EPA should complete a full review of all U.S. obligations under the UNFCCC and any related agreements. This review should ensure that no existing



commitments hinder energy abundance and economic growth. The review should also evaluate the financial and policy commitments that disproportionately affect U.S. interests compared to major emitters such as China, including any obligations to transfer resources to other nations under the UNFCCC framework.



2: Abandon the so-called "whole of government" approach to climate

The "whole of government approach to climate," in practice, is a systematic attack on fossil fuel investment, production, refining, and transport, increases energy prices, makes our grid less reliable, and slows our economy while failing to significantly reduce global greenhouse gas emissions.

Accordingly, all federal departments and agencies should cease efforts to incorporate fossil fuel reduction into their core missions, where such actions are based solely on non-statutory mandates, executive directives, or administrative guidance, unless explicitly mandated by law.

The heads of all federal departments and agencies should review and, as appropriate to achieve the four irrefutable principles of energy and climate policymaking, rescind or modify all regulations, policies, guidance documents, and programs that were adopted as part of the so-called "whole of government approach to climate." This includes, but is not limited to, climate action plans, sustainability initiatives, and greenhouse gas reduction targets set by individual agencies that do not have statutory requirements.

Furthermore, the President should rescind the following executive orders, as they further a faulty "whole-of-government" approach to climate change:

- (a) Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis" (January 20, 2021).
- (b) Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad" (January 27, 2021).
- (c) Executive Order 14013, "Rebuilding and Enhancing Programs To Resettle Refugees and Planning for the Impact of Climate Change on Migration" (February 4, 2021).
- (d) Executive Order 14027, "Establishment of the Climate Change Support Office" (May 7, 2021).
- (e) Executive Order 14030, "Climate-Related Financial Risk" (May 20, 2021).
- (f) Executive Order 14057, "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability" (December 8, 2021).
- (g) Executive Order 14082, "Implementation of the Energy and Infrastructure Provisions of the Inflation Reduction Act of 2022" (Sep 16, 2022).
- (h) Executive Order 14096, "Revitalizing Our Nation's Commitment to Environmental Justice for All" (April 21, 2023).



3: Re-examine the EPA's 2009 Endangerment Finding

EPA's 2009 Endangerment Finding, which found that greenhouse gases greenhouse gases "endanger both the public health and the public welfare of current and future generations," (1) was fundamentally unbalanced, in that it only focused on potential threats from greenhouse gases emitted by fossil fuels but ignored the enormously larger public health and climate mastery benefits of fossil fuels, and (2) has been contradicted by more recent data, such as the significant decline in climate-related deaths over the past century.

Accordingly, the Administrator of the EPA should initiate a formal rulemaking process, in adherence with both the law and the four irrefutable principles of energy and climate policymaking, to re-examine the 2009 Endangerment Finding related to greenhouse gases.

The re-examination of the 2009 Endangerment Finding should additionally be conducted in full compliance with the statutory obligations under the Clean Air Act and consistent with judicial rulings, including but not limited to Massachusetts v. EPA (2007), which recognized the EPA's authority to regulate greenhouse gases but did not mandate any specific methodology for determining endangerment. The EPA should ensure that any revisions or reconsiderations of the Endangerment Finding adhere to these legal precedents.

In conducting this rulemaking process, the EPA should:

- (a) Consider whether the predictions of harm to public health and welfare posed by fossil fuel use have been borne out by current data and scientific understanding, including trends such as the significant decline in climate-related deaths over the past century, during which fossil fuel use has increased.
- (b) Evaluate the impact of U.S. greenhouse gas reductions on global levels of CO2 and other greenhouse gases, specifically analyzing whether reductions within the U.S. can reduce worldwide greenhouse gas concentrations for the rest of the century. The EPA should assess whether U.S. efforts to reduce greenhouse gases can provide any net reduction in global greenhouse gas concentrations over the next 20 to 75 years, given that a reduction in global levels requires global net-zero emissions and the U.S. currently produces 1/7 of the emissions, a share that is declining.
- (c) Base its findings only on impacts within the next 20 years, as estimates beyond that period are speculative and subject to significant future technological, economic, and knowledge developments.
- (d) Recognize the significant benefits of fossil fuel use to public health and welfare, including (1) the role of fossil fuels in improving the American quality of life by providing affordable, reliable, and scalable energy; and (2) the climate mastery benefits of fossil fuels, such as infrastructure, technology, and adaptive measures that reduce climate danger (e.g., irrigation, storm defenses, temperature regulation).
- (e) Give equal weight and thorough consideration to both the positive and negative effects of greenhouse gas emissions, ensuring that the benefits of CO2 fertilization, reduced



- cold-related mortality, and the public health, economic, and security benefits of fossil fuel use are as rigorously assessed as any potential risks.
- (f) Apply a scientifically rigorous and transparent framework, with an emphasis on open-source data and methodologies. The EPA should ensure that the methodologies, data, and conclusions reached in the re-examination of the Endangerment Finding are subject to independent review, conducted by external experts with no vested interest in the outcome, to guarantee the scientific integrity and objectivity of the findings.



4: Reject artificially low discount rates that do not reflect economic best practices

When conducting regulatory analyses, federal agencies should use discount rates that reflect economic realities, and reject artificially low discount rates, which lead to skewed regulatory decision making by inflating the projected costs of carbon emissions.

To that end, all federal departments and agencies should ensure that discount rates used in cost-benefit analyses and regulatory assessments reflect economic realities. In particular, all federal departments and agencies should apply 3% and 7% discount rates in all cost-benefit analyses and regulatory impact assessments, in accordance with OMB Circular A-4. These rates reflect:

- (a) 3% as the social rate of time preference, which accounts for the rate at which society is willing to trade present consumption for future benefits.
- (b) 7% as the opportunity cost of capital, reflecting the rate of return on private capital in the economy.

Discount rates lower than 3% should only be used if explicitly justified by unique circumstances, supported by overwhelming economic evidence demonstrating that the lower rate is indispensable for accurately reflecting the economic conditions of the specific regulatory action. Such requests should also be reviewed and explicitly approved by the Office of Management and Budget (OMB), which should grant approval only when the use of a lower rate is essential to fulfilling statutory or regulatory obligations.

The Director of OMB should revise Circular A-4 to explicitly state that agencies are to default to the 3% and 7% rates unless compelling evidence supports the use of an alternative rate. OMB should oversee the application of these guidelines across all federal agencies.

Additionally, OMB should initiate a formal review process to evaluate whether the 3% discount rate used in regulatory analyses is too low given the need for realistic modeling of behavior in investment and other decisions. OMB should:

- (a) Assess whether the 3% rate adequately reflects the social rate of time preference in the modern economy.
- (b) Consider the impact of maintaining or increasing the 3% rate on regulatory analyses, particularly in sectors involving long-term investments or climate-related assessments.

OMB should consult with economic experts, academic institutions, industry stakeholders, and relevant federal agencies to ensure a comprehensive review of the discount rate.



5: Cease the direct and indirect use of unrealistic emissions scenarios

When conducting regulatory analyses, federal agencies should use realistic emissions scenarios that reflect the most plausible global energy and emissions trajectories, and reject unrealistic emissions scenarios that are based on outdated assumptions about future energy use and emissions trends.

To that end, all federal departments and agencies should cease the direct and indirect usage, in any regulatory analysis, environmental review, or cost-benefit assessment, of emissions scenarios and any other assumptions about future emissions that are in line with an increase of global surface temperature increases over 3°C above preindustrial levels by the year 2100. Assumptions that emissions increases that will lead to warming beyond 3°C above industrial levels by 2100 are widely considered by experts to be increasingly implausible and to significantly overestimate future emissions relative to current global energy and emissions trends.

Agencies should instead utilize scientifically supported emissions scenarios and assumptions that reflect current policy pathways, realistic energy trajectories, and projected global energy use. Acceptable scenarios may include RCP4.5, SSP2-4.5, or other scenarios consistent with the latest data reflecting realistic long-term trajectories of greenhouse gas emissions and concentrations, leading to warming of no more than 3°C above preindustrial levels by the year 2100.

Agencies should still adhere to their statutory obligations to assess climate-related risks under applicable laws, such as the Clean Air Act and National Environmental Policy Act (NEPA). Agencies should ensure that their climate models and assessments comply with these statutes while using scientifically supported emissions scenarios.

Additionally, the Office of Management and Budget (OMB) should revise OMB Circular A-4 to align with the discontinuation, in regulatory assessments, of mission scenarios and assumptions that are in line with a global surface warming of more than 3°C above preindustrial levels by the year 2100. The revised guidance should provide agencies with clear instructions on the appropriate use of emissions scenarios that align with current scientific and economic principles.



6: Prioritize federal funding for climate mastery and energy abundance research

As a part of promoting a balanced approach to climate science, federal funding for climate and energy research should prioritize studies into the benefits of energy abundance and technological innovation in addressing climate challenges, and not disproportionately prioritize approaches that emphasize the reduction of fossil fuel.

To that end, NASA, NOAA, DoE, EPA, and USGS should conduct a comprehensive review of their existing guidelines for grants and funding related to climate and energy research, to the extent permitted by law and consistent with each agency's statutory obligations. This review should include an assessment of whether current funding practices:

- (a) Mandate the promotion of research aimed at advancing climate mastery, defined as the ability to decrease danger from climate through technology, infrastructure, and innovation.
- (b) Require a balanced exploration of climate science, including an explicit mandate to fund research that challenges prevailing hypotheses and models.
- (c) Promote review and balanced council of policy decision makers by including competing teams of independent researchers ("red teams.")

Each agency should update its guidelines to:

- (a) Promote energy abundance—by mandating priority funding for studies focused on the benefits of fossil fuel energy and other reliable energy sources.
- (b) Advance climate mastery—by requiring funding for studies on technologies and practices that directly enhance human resilience to climate-related risks, such as storm defenses, agricultural innovation, temperature regulation, and adaptive infrastructure.
- (c) Ensure scientific diversity—by giving preferential funding to studies that challenge prevailing models or present alternative hypotheses about the climate effects of fossil fuels, in alignment with the principles of the scientific method and the null hypothesis.

Agencies should ensure that updated guidelines require transparency in the selection and evaluation of research proposals. This includes:

- (a) Public disclosure of the criteria used to assess the scientific merit of projects.
- (b) A commitment to the highest level of scientific integrity and objectivity in the evaluation process.



7: Reform international bodies to eliminate anti-fossil-fuel bias

The International Energy Agency, the World Bank, and the International Monetary Fund should be focused on opposing energy poverty and promoting energy security and economic development, not on reducing fossil fuel use. To the extent that such agencies are focused on reducing fossil fuel use, this disproportionately burdens the United States and also harms poorer nations that rely on affordable energy for development.

To that end, the United States should nominate a highly qualified candidate for Executive Director of the International Energy Agency (IEA), who possesses deep expertise in global energy markets and is committed to promoting energy abundance and development. The nominee should be dedicated to serving as an honest broker of information, providing realistic, data-driven assessments of energy supply and demand.

The United States, through the Department of State, should formally communicate to IEA member nations the need for leadership that:

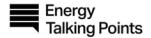
- (a) Prioritizes energy security and economic development, recognizing the world's reliance on fossil fuels for their unmatched reliability and scalability to meet growing energy demands.
- (b) Rejects unrealistic net-zero emissions goals, which compromise global development and economic growth.
- (c) Opposes energy poverty and recognizes the essential role of fossil fuels in powering economic growth and improving living standards.

The Secretary of State, in consultation with the Secretary of Energy, should leverage the United States' significant financial contributions to the IEA to influence reforms that align with U.S. priorities. The U.S. should advocate for energy abundance as a key principle, and for the freedom to develop and use fossil fuels due to their currently unique benefits.

The United States should also nominate a highly qualified candidate for President of the World Bank, who possesses deep expertise in monetary and development policies and is committed to energy abundance, rapid development of poor nations, and technology-neutral financing practices.

The United States, through the Department of State, should formally communicate to World Bank member nations the need for leadership that:

- (a) Recognizes that the danger of continued poverty from lack of resources and productive ability of billions of people across the globe is the greatest and most immediate threat to health and prosperity.
- (b) Rejects development policies and financing that discriminate against fossil fuels, such as coal, oil, and gas.



- (c) Opposes an agenda of delayed economic growth, imposing costly renewable energy projects on developing countries, and other harmful practices of development policy that has kept too many people unnecessarily in poverty for too long.
- (d) Recognizes the threat "net-zero" policies pose to global development and human life and health, especially in developing nations.

Additionally, the United States, as the primary contributor to the International Monetary Fund, should exercise its substantial leverage to ensure the Fund's policies and leadership align with the goal of promoting energy abundance.

The United States, through the Department of State, should formally communicate to International Monetary Fund member nations, especially our European partners, the need for policy priorities and leadership that:

- (a) Recognize the necessity of continued fossil fuel use over the next decades both in developed and especially in developing nations.
- (b) Recognize the threat to human health and prosperity posed by "net-zero" policies that discriminate against fossil fuel investments.



8: Ensure that agencies facilitate, rather than obstruct, climate mastery

Agencies should facilitate effective approaches to climate mastery, including in the realm of wildfire management, and resist the destructive influence that conservation and environmental advocates have on preventing life-saving wildfire measures.

To that end, the Department of Energy, the Environmental Protection Agency, the Department of the Interior, and the Department of Agriculture should assess opportunities to enhance climate mastery in accordance with the four irrefutable principles of energy and climate policymaking. This review should include:

- (a) Identifying technologies and practices that can increase resilience or adapt to climate risks, including extreme weather events, droughts, and floods, without risking reduction in economic growth or technological innovation, which are generally the primary drivers of resilience to climate dangers and other future threats.
- (b) Evaluating how current policies either contribute to or hinder climate mastery, and proposing revisions to better align with national priorities of energy abundance and resilience against climate risks.

The U.S. Forest Service and the Bureau of Land Management (BLM) should review and update current wildfire management practices in accordance with the four irrefutable principles of energy and climate policymaking. This review should include:

- (a) Evaluating the effectiveness of logging, controlled burns, and vegetation management in reducing wildfire risks.
- (b) Assessing whether the Roadless Area Conservation Rule hinders effective wildfire management and recommending revisions, if necessary, to allow for better access and fire prevention measures.
- (c) Exploring additional land management strategies, including road access, to improve wildfire suppression and prevention efforts.
- (d) Assessing to what extent NEPA processes and litigation have stalled or prevented measures to control and avoid wildfires.



9: Identify regulatory barriers that impede alternative energy development

Federal agencies should avoid obstructing, with unnecessary regulation, cost-effective alternative energy sources from becoming potentially competitive on the free market.

To that end, each federal department and agency involved in energy, infrastructure, environmental, and economic regulation, including but not limited to the Department of Energy (DoE), the Environmental Protection Agency (EPA), the Department of Transportation (DoT), and the Department of the Interior (DoI), should conduct a comprehensive study to identify regulatory barriers that impede the development and deployment of cost-effective alternative energy with a special emphasis on nuclear technology, which is the currently most promising competitor for fossil fuels.

The study should include, but not be limited to, an assessment of:

- (a) Lengthy or overly burdensome permitting processes for alternative energy projects, particularly for nuclear energy facilities, including delays related to site licensing, reactor design certification, and construction approvals.
- (b) Redundant or conflicting regulations between federal, state, and local authorities that increase costs or delay project approvals. Special attention should be given to the Nuclear Regulatory Commission's (NRC) regulatory framework to identify areas where modernization or streamlining could accelerate the deployment of new nuclear technologies, such as small modular reactors (SMRs).
- (c) Regulations that prevent or limit new technologies from entering the energy market.
- (d) Regulatory constraints that limit access to financing or increase the cost of capital for alternative energy projects.
- (e) Unfair market compensation rules that provide direct or indirect preferences for specific technologies or that undermine competitiveness of competing technologies, like the ability of solar and wind to bid into electricity auctions without expectation of any actual level of production similar to the bid.

Agencies should consult with stakeholders, including nuclear energy industry experts, reactor designers, energy producers, and state and local governments, to gather comprehensive data and insights on regulatory challenges specific to nuclear energy.