THIRD WAY

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The Increasing Value of Nuclear to Catch Up on Climate

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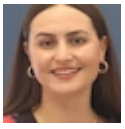

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In April, the Government Accountability Office (GAO) released a report concluding that the US Nuclear Regulatory Commission (NRC) does not fully consider intensifying climate change impacts, including extreme weather events, in its current standards and processes. The GAO report claims that as

climate effects amplify and become more frequent, they may pose increasing risks to nuclear plant operations and safety.

While this report rightly recommends that the NRC should fully address climate risks to nuclear power plants, it may raise unnecessary concern about the resilience of nuclear facilities in the face of climate change or the NRC's ability to respond. In reality, a large scale-up of nuclear energy is essential to avert the most catastrophic effects of climate change and the NRC is well-positioned to oversee this expansion while ensuring the continued safety of our nuclear fleet. The NRC has a stellar historical track record for safety, reputation as a global standard-setter, and rigorous oversight processes that consider even more extreme scenarios and contingencies.

From a wider vantage point, we must prepare for the fact that *all* energy technologies will be impacted by a changing climate, and we should not let that prevent us from deploying the clean energy technologies—like nuclear—critical for mitigating and adapting to climate change.

Facing Reality... and Seeing the Broader Truth

The central premise of the GAO report is that the NRC relies on historical data and does not account for projections on the effects of climate change, the risks of which are expected to grow in the future.

While the NRC should certainly ensure that its processes are ready for a changing climate (like all permitting agencies), the agency is already well-prepared to safeguard our nuclear plants from hurricanes, floods, and other climate change-related hazards. The US is home to the world's highest safety standards for its nuclear facilities and the NRC's oversight and emergency preparedness protocols are extremely robust.

This is great news considering we will need the NRC to steward the expansion of America's nuclear energy fleet in order to meet climate goals.

Furthermore, the GAO report only focuses on one side of the equation—climate effects on nuclear—and overlooks the bigger picture. Yes, climate change will affect nuclear power, just as it will all of our energy technologies. But we also need nuclear to reduce emissions AND adapt to a changing climate.

Hesitancy or reluctance in deploying nuclear because of climate risks leads to a catch-22—failure to fully leverage a major tool to mitigate climate change for fear of climate's effects.

Thus, even as we concede points of validity in the GAO study, we must not miss the forest for the trees...

Nuclear: Key to Rallying on Climate and Managing Climate Impacts

Looking from a broader perspective, acknowledging that we are behind on climate action and will be more and more compelled to address heightening climate impacts, we see that nuclear energy *becomes increasingly valuable*.

In other words, as rallying on climate change and managing escalating climate risks become more urgent, there will be a growing premium on the characteristics and attributes of nuclear energy, namely:

Resilience

Compared to other electricity generating technologies, nuclear has historically had the highest average capacity factors—that is, its ability to operate at close to maximum possible output. In simpler terms, nuclear keeps operating (and often at near full capacity) even in spite of external factors and events that may cause other generation types to shut down. Indeed, closer examination of the recent operating record of US nuclear plants during extreme weather and natural events reveals nuclear's capability to withstand and continue operations despite such phenomena. This exceptional quality of nuclear will come into sharper focus as

we deal with more frequent and intense storms, hurricanes, and flooding events from climate change.

Density

As climate change results in loss of arable land and coastline, greater land use efficiency with our energy infrastructure will become progressively more vital. Nuclear plants generate a significant volume of energy and power within a relatively small footprint. Moreover, inclusion of nuclear in the energy mix further lessens the need for sprawling transmission networks, minimizing the land use intensity of our energy systems overall and reducing the costs of weatherizing grid infrastructure.

Intensity

Nuclear's potential to power energy-intensive processes and activities—crucially without emissions—will become more salient as we get deeper into our struggle against climate. To highlight a few examples:

- **Negative emissions technologies:** Considering that we have fallen behind on climate, we will be forced to address and draw down carbon that has already been emitted into the atmosphere. Negative emissions technologies like direct air capture (DAC) are highly energy-intensive, and pairing DAC with nuclear energy is already being explored by industry and US national laboratories. Third Way partnered with Gensler to develop renderings of a nuclear-powered DAC hub that would remove legacy emissions at scale.

- **Water stress and desalination:** Climate-induced water stress—a rapidly compounding worldwide problem that is arguably the most worrisome of all the impacts from climate change—will likely result in increased global demand for desalination. Desalination is a very energy-intensive process that has traditionally been dependent on fossil fuel use; nuclear is capable of providing the considerable energy requirements of desalinating water, but without emitting carbon or air pollution.

- **Growing importance of clean hydrogen:** Third Way was a leading partner in the Decarb America research initiative, which modeled different pathways to achieving net-zero by midcentury—all of which require a massive expansion of clean hydrogen. Nuclear energy plays an important role in clean hydrogen production, *especially in scenarios where a delay in electrification* drives up demand for hydrogen and other zero-carbon fuels. Third Way believes that nuclear energy will be critical for clean hydrogen production at scale, and that nuclear can serve as a pivotal catalyst to kickstarting the clean hydrogen supply chain. And as we play catch-up on climate, nuclear-produced hydrogen becomes even more crucial.

Implications for Policy

The fight against climate change cannot be seen as a race towards a static target; we should expect counterpunches along the way. As such, the logic of climate adaptation and resilience should extend beyond our societies, lifestyles, and behaviors, but also to our future clean energy system.

We often discuss climate action in terms of "X-amount" of clean energy capacity we must add. It is no longer sufficient that our energy is low emissions, but given our circumstances, also has the requisite reliability, firmness, resiliency, land use efficiency, and intensity: qualities that nuclear possesses in spades.

All considered, the implications for policy are immense:

Redoubling Efforts to Modernize the NRC

An internal NRC assessment on identifying potential gaps in addressing increased climate risks, as the GAO recommends, is a prudent step considering the challenges we face. Equally as important, however, are efforts to modernize the NRC towards becoming a more effective and efficient regulator capable of evaluating a wide range of reactor designs and processing greater volumes of license applications in the future. With our climate future hanging in the balance,

passage of legislation intended to streamline processes at the agency, among other helpful provisions, is of the essence.

Advanced Reactors: Keeping Our Foot on the Pedal

Advanced reactors boast the potential for enhanced passive safety profiles, smaller footprints, reduced water requirements, higher energy and temperature outputs, and greater diversity in uses and applications—all traits of growing value in a period of burgeoning climate risks. Building upon the wins of the Biden Administration on advanced reactor demonstrations, we absolutely must maintain robust federal support (e.g., Advanced Reactor Demonstration Program) for developing these technologies and overcome initial hurdles towards commercial maturity and competitiveness.

The Global Market May Be Even Greater than Projected

The effects of climate change will be felt worldwide, and thus, the increasing value of nuclear energy in the face of these risks will impact interest and demand *at a global scale*. It is conceivable that factors related to climate impacts may result in an international nuclear market that is even greater than current targets for nuclear deployment (e.g., COP28 declaration to triple nuclear capacity by 2050) might suggest.

A larger than anticipated global market would mean that it is all the more important to engage in an ambitious build-out of new, innovative reactors (see Third Way's 20x35 campaign), drive these technologies towards cost competitiveness, and enhance our ability to outcompete our geopolitical rivals overseas. US global leadership and market presence can no longer be considered a luxury.