



Peace Meal - Food for Thought

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Yes, nuclear weapons are immoral.

Ward Hayes Wilson

Almost everyone who works actively against nuclear weapons is, at some level, appalled by the immorality of nuclear weapons. This makes sense because the indiscriminate killing of children, grandparents, people with disabilities, and a host of other ordinary folks is appalling.

As a result, the first argument that almost all activists reach for is moral. They bring forward hibakusha (Japanese A-bomb survivors) to put a human face on the immorality. They talk about the indigenous people who suffered during the mining and production of nuclear weapons. They show graphic pictures of the destruction, the burns, the radiation sickness, and other catastrophic damage done by the bombings. They say, in effect, "Look at the immorality!" They sometimes point to it with a hint of outrage in their voices. How can people not be moved by these horrible, immoral acts?

And yet here we are, 78 years later, in the midst of a second nuclear weapons arms race. Every nation that possesses nuclear weapons is either expanding or upgrading its nuclear arsenal. How can this be?

It seems undeniable, after the better part of a century has passed, that moral arguments are not enough to eliminate nuclear weapons. When a strategy fails for 78 years, it's time for a rethink.

I believe most people — including national leaders — hesitate to eliminate nuclear weapons not because they are heartless or lack any sense of morality, but because they believe that nuclear weapons are necessary. After all, people often set their moral feelings aside when they believe their survival is at stake.

In the case of nuclear weapons, many people believe that they are so powerful that they can guarantee a country's safety. Therefore it makes sense that most countries secretly want such weapons and, as a consequence, nuclear weapons will always exist. They are such desirable weapons that, even if you could ban them, someone would inevitably build an arsenal in secret. So it's impractical to even think about eliminating them.

If this analysis of how people feel is right, then there are two parts to the nuclear weapons elimination equation: morality and necessity. We can only solve the equation if we take on both parts. But we have to solve the parts in the right sequence. Before we can move people with moral discourse, we have to remove the roadblock in their heads that tells them that their country must have nuclear weapons to keep them safe.

The key to eliminating nuclear weapons, then, is to make a case that they could reasonably, realistically be eliminated, neutralize that part of the equation, and the morality argument falls like a hammer blow. But a devil's advocate might argue, "there are no practical arguments for eliminating nuclear weapons." Well, actually, there are. A lot of them. Let me point out just three.

First, you may have noticed that when Vladimir Putin threatened to use nuclear weapons in Ukraine last fall, a number of establishment sources suddenly spoke up, making the case that nuclear weapons actually aren't very useful weapons. The *New York Times*, The Institute for the Study of War, and even Gen. David Petraeus all argued that using nuclear weapons on the battlefield wasn't militarily useful.

And if you look back over past wars, military commanders have repeatedly turned away from using nuclear weapons — not because of moral concerns, but because of practical doubts about the military value of the weapons.

It has been an open secret in Washington for decades that battlefield use of nuclear weapons was militarily inadvisable. When President George H. W. Bush ordered the removal of all but a handful of 7,000 tactical nuclear weapons from Europe in 1991, there was no open revolt among military officers. Apparently, they were agreeable with the decision. So there is a good deal of evidence, based on the advice of military officers, that nuclear weapons aren't useful.

Which brings us to another argument: What about using nuclear weapons not on the battlefield but against an enemy's homeland? Well, if your adversary also has nuclear weapons, that option is, if anything, worse. When your adversary strikes back, your country will be devastated. It is clearly a suicidal option. And if your adversary doesn't have nuclear weapons, it's not war, it's genocide.

Finally, many people argue that nuclear weapons are important because of nuclear deterrence. But we can effectively show that deterrence is fatal over the long run, because human beings are fallible and they play a critical role in nuclear deterrence. Human beings make the threats, evaluate the threats, and decide how to respond. If human beings are prone to folly—and we are — and if human beings guide the deterrence process, then nuclear deterrence is inherently flawed. It will fail. Over the long run, it cannot be safe. Eventually, human failure will lead to a catastrophic nuclear war.

Moral arguments are powerful in the campaign against nuclear weapons, but a roadblock prevents moral arguments from working. In fact, it causes them to boomerang and turn people off. But if you're willing to argue against nuclear weapons with a two-step process — first showing that the necessity argument is false and only then arguing that the weapons are horrible and immoral — there's a clear pathway to elimination.

Ward Hayes Wilson is the author of *Five Myths About Nuclear Weapons* and the forthcoming (Oct. 24) *It Is Possible: A Future Without Nuclear Weapons*.

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2023 Pakistan nuclear weapons

Hans M. Kristensen, Matt Korda & Eliana Johns
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Pakistan continues to gradually expand its nuclear arsenal with more warheads, more delivery systems, and a growing fissile material production industry. Analysis of commercial satellite images of construction at Pakistani army garrisons and air force bases shows what appear to be newer launchers and facilities that might be related to Pakistan's nuclear forces.

We estimate that Pakistan now has a nuclear weapons stockpile of approximately 170 warheads. Our estimate comes with considerable uncertainty because Pakistan does not publish much information about its nuclear arsenal.

With several new delivery systems in development, four plutonium production reactors, and an expanding uranium enrichment infrastructure, Pakistan's stockpile has the potential to increase further over the next several years. The size of this projected increase will depend on several factors, including how many nuclear-capable launchers Pakistan plans to deploy, how its nuclear strategy evolves, and how much India's nuclear arsenal grows. We estimate at the current growth rate that the country's stockpile could grow to around 200 warheads by the late 2020s. But unless India significantly expands its arsenal or further builds up its conventional forces, it seems reasonable to expect that Pakistan's nuclear arsenal will not continue to grow indefinitely but might begin to level off as its current weapons programs are completed.

Our estimates and analyses are derived from a combination of open sources such as declassified government documents, industry publications, and commercial satellite imagery. Because each one of these sources provides different and limited information that is subject to varying degrees of uncertainty, we cross-check the data by using multiple sources and supplementing them with private conversations with officials whenever possible.

Analyzing Pakistan's nuclear forces is particularly fraught with uncertainty, given the lack of official state-originating data. The Pakistani government does not regularly publish any official documentation explaining the contours of its nuclear posture or doctrine. The most regular official source on Pakistani nuclear weapons is the Inter Services Public Relations, the media wing of the Pakistan Armed Forces, which publishes regular press releases for missile launches.

Occasionally, other countries offer official statements or analysis about Pakistan's nuclear forces. For example, the U.S. Air Force's ballistic and cruise missile threat reports include analyses of Pakistani missile forces. As Pakistan's regional competitor, India's officials also occasionally make statements about Pakistan's nuclear weapons, although such statements must be taken with a grain of salt as they are often politically motivated. There are very few publications that researchers can turn to for reliable information about Pakistan's nuclear forces, and every rumor must be carefully investigated.

Given the absence of reliable data, commercial satellite imagery has become a particularly critical resource for analyzing Pakistan's nuclear forces. Satellite imagery makes it possible to identify air, missile and navy bases, as well as

potential underground storage facilities. The greatest challenge of analyzing Pakistani nuclear forces with satellite imagery is the lack of reliable data with regards to whether certain military bases are associated with nuclear or conventional strike missions or both.

Within its broader philosophy of "credible minimum deterrence," which seeks to emphasize a defensive and limited nuclear posture, Pakistan operates under a nuclear doctrine that it calls "full spectrum deterrence." This posture is aimed mainly at deterring India, which Pakistan identifies as its primary adversary. The belief that Pakistan's nuclear weapons have been deterring India since the mid-1980s has solidified the value of nuclear weapons in the nation's security calculus.

According to Lt. Gen. (Ret.) Khalid Kidwai — an advisor to Pakistan's National Command Authority — "full spectrum deterrence" implies that Pakistan possesses the full spectrum of nuclear weapons in three categories: strategic, operational and tactical, with full range coverage of the large Indian land mass and its outlying territories; there is no place for India's strategic weapons to hide. Pakistan retains the liberty of choosing from a full spectrum of targets in a "target-rich India," to include counter value, counter force and battlefield targets, notwithstanding India's ballistic missile defense system.

Pakistan's nuclear posture — particularly its development and deployment of tactical nuclear weapons — has created considerable concern in other countries, including the United States, which fears that it increases the risk of escalation and lowers the threshold for nuclear use in a military conflict with India. Over the past decade-and-a-half, the U.S. assessment of nuclear weapons security in Pakistan appears to have changed considerably from confidence to concern, particularly because of the introduction of tactical nuclear weapons.

After the emergence of tactical nuclear weapons, the Obama administration asserted that battlefield nuclear weapons, by their very nature, pose a security threat because they cannot be made as secure. Subsequently, the Trump administration echoed this assessment: "We are particularly concerned by the development of tactical nuclear weapons that are designed for use in battlefield. We believe that these systems are more susceptible to terrorist theft and increase the likelihood of nuclear exchange in the region." The Trump administration's South Asia strategy urged Pakistan to stop sheltering terrorist organizations, notably to "prevent nuclear weapons and materials from coming into the hands of terrorists."

In the 2019 Worldwide Threat Assessment, U.S. Director of National Intelligence Daniel R. Coats said, "Pakistan continues to develop new types of nuclear weapons, including short-range tactical weapons, sea-based cruise missiles, air-launched cruise missiles, and longer-range ballistic missiles," noting that "the new types of nuclear weapons will introduce new risks for escalation dynamics and security in the region."

Pakistani officials, for their part, reject such concerns. In 2021, then-Prime Minister Imran Khan stated that he was "not sure whether we're growing [the nuclear arsenal] or not

because as far as I know ... the only one purpose [of Pakistan's nuclear weapons] — it's not an offensive thing." He added that "Pakistan's nuclear arsenal is simply a deterrent, to protect ourselves."

After years of highly-publicized U.S. concerns over the security of Pakistan's nuclear weapons, Pakistani officials have repeatedly challenged the notion that the security of their nuclear weapons is deficient. Samar Mubarik Mund, the former director of the country's National Defense Complex, explained in 2013 that a Pakistani nuclear warhead is "assembled only at the eleventh hour if [it] needs to be launched. It is stored in three to four different parts at three to four different locations. If a nuclear weapon doesn't need to be launched, then it is never available in assembled form."

Pakistan has a well-established and diverse fissile material production complex that is expanding. It includes the Kahuta uranium enrichment plant east of Islamabad, which appears to be growing with the near-completion of what could be another enrichment plant, as well as the enrichment plant at Gadwal to the north of Islamabad. Four heavy-water plutonium production reactors appear to have been completed at what is normally referred to as the Khushab Complex some 20 miles south of Khushab in Punjab province.

The New Labs Reprocessing Plant at Nilore, east of Islamabad, which reprocesses spent fuel and extracts plutonium, has been expanded. Meanwhile, a second reprocessing plant located at Chashma in the northwestern part of Punjab province may have been completed and become operational by 2015. A significant expansion to the Chashma complex was under construction between 2018 and 2020. And in June 2023, China and Pakistan signed a memorandum of understanding for a \$4.8 billion deal to construct a new 1,200-megawatt reactor at Chashma.

Nuclear-capable missiles and their mobile launchers are developed and produced at the National Defense Complex located in the Kala Chitta Dahr mountain range west of Islamabad. Little is publicly known about warhead production, but experts have suspected for many years that the Pakistan Ordnance Factories near Wah, northwest of Islamabad, serve a role. One of the Wah factories is located near a unique facility with six earth-covered bunkers inside a multi-layered safety perimeter with armed guards.

A frequent oversimplification for estimating the number of Pakistani nuclear weapons is to derive the estimate directly from the amount of weapons-grade fissile material produced. As of the beginning of 2023, the International Panel on Fissile Materials estimated that Pakistan had an inventory of approximately 10,800 pounds (plus or minus 3,300 pounds) of weapons-grade (90 percent enriched) highly enriched uranium (HEU), and about 1,100 pounds (plus or minus 375 pounds) of weapons-grade plutonium. Assuming each first-generation implosion-type warhead's solid core uses 33 to 40 pounds of weapons-grade HEU or 11 to 13 pounds of plutonium, this fissile material would theoretically be enough to produce a maximum of approximately 188 to 436 HEU-based single-stage warheads and 55 to 134 plutonium-based single-stage warheads if fully expended. However, Pakistan's warhead designs may have undergone some iteration and have become more

efficient.

It is important to note that calculating stockpile size based solely on fissile material inventory is an incomplete methodology that tends to overestimate the likely number of nuclear warheads. Instead, warhead estimates must take several other factors into account in addition to the amount of weapons-grade fissile material produced, including the warhead design choice and efficiency, warhead production rates, number of operational nuclear-capable launchers, number of launchers with dual-capability, and nuclear doctrine.

Nuclear warheads estimates must assume that not all of Pakistan's fissile material is used for weapons. Like other nuclear-armed countries, Pakistan most probably keeps some fissile material in reserve. Pakistan also does not have enough nuclear-capable launchers to accommodate several hundreds of warheads. Moreover, all of Pakistan's launchers are thought to be dual-capable, which means that some of them, especially the shorter-range systems, may serve non-nuclear missions. We estimate that Pakistan currently is producing sufficient fissile material to build 14 to 27 new warheads per year, although we estimate that the actual warhead increase in the stockpile probably averages around 5 to 10 warheads per year.

Pakistan appears to have six currently operational nuclear-capable, solid-fuel, road-mobile ballistic missile systems. Two other nuclear-capable ballistic missile systems are currently under development

The Pakistani road-mobile ballistic missile force has undergone significant development and expansion over the past two decades. This includes possibly eight or nine missile garrisons, including four or five along the Indian border for short-range systems and three or four other garrisons further inland for medium-range systems. In 2022 and 2023, Pakistan conducted significantly fewer public missile test launches than in earlier years, which may be related to Pakistan's ongoing political instability and countrywide protests following the ousting and subsequent arrest of former Prime Minister Imran Khan in mid-2022.

The total number and location of Pakistan's nuclear-capable missile bases and facilities remains unknown. In particular, it is highly challenging to discern between Pakistani military bases intended to serve conventional-only strike roles and those intended to serve dual-capable or nuclear-specific strike roles. Analysis of commercial satellite imagery suggests that Pakistan maintains at least five missile bases that could serve a role in Pakistan's nuclear forces.

Pakistan is also developing a sea-launched version of a nuclear-capable missile. The future submarine-based nuclear capability is managed by Headquarters Naval Strategic Forces Command, which the government said in 2012 would be the "custodian of the nation's 2nd strike capability" to "strengthen Pakistan's policy of Credible Minimum Deterrence and ensure regional stability."

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Nuclear power: Why the divide in expert views?

Joan Blades & John Harte

Within the large community of scientists who share deep concern over climate change and accept the urgent need to greatly reduce carbon emissions, there is a sharp divide over the future role of nuclear power in the global energy mix. Among these scientists, arguments for nuclear power's necessity, desirability, dangers and impracticality abound.

The case for nuclear power as a necessary component of the fight against climate change typically assumes that sun, wind, and increased efficiency cannot meet future energy needs, particularly baseload demand. Those making the case for the desirability of nuclear power emphasize the relatively small amount of land needed to obtain nuclear fuel and site reactors, and the near absence of the pollutants associated with fossil fuel burning during operation.

Those warning of unacceptable dangers associated with nuclear power generation point to accidents at Fukushima and Chernobyl, to increasing threat of nuclear war among nations if more and more nations have the capability to produce weapons-grade isotopes, to stages in the fuel cycle that could be vulnerable to diversion of radioactive material by terrorists, and to potential leakage from spent fuel storage sites. Those arguing that increased use of nuclear power is impractical mainly emphasize its relatively high cost, its lengthy deployment time, and the absence of widespread public acceptance.

To try to determine whether these viewpoints reflect factual disagreements, one of us (Blades) organized an expert "Living Room Conversation." The objective was to bring knowledgeable people with diverging views together, to talk with each other, learn whether there is common ground on the future role of nuclear power in reducing carbon emissions, and if not, to try to identify the kind of information needed to achieve agreement on key facts. Such small, structured Living Room Conversations are designed to encourage curiosity and listening across political and other differences.

This conversation was held in July. The six conversants included two environmental scientists whose research emphasizes climate change; one has argued that nuclear power is key to an emissions-free future (argument from necessity), and one has argued that the costs will remain prohibitive while alternatives to nuclear power are adequate (argument from impracticality and lack of necessity). The other four participants included one who had expertise on the U.S. electric grid, one who was a radiation protection specialist, and two who were progressive climate action organizers concerned because the trusted experts they have relied on were telling them conflicting stories about the best path forward with regard to nuclear energy.

There were substantial areas of agreement in the conversation beyond consensus about the need to reduce emissions as much as we can, as quickly as we can, and as cheaply as we can, without causing unacceptable impacts on human welfare. There was consensus about the need for reliable baseload power and for modernizing the electric grid in the United States. There was general enthusiasm for future improvements in energy efficiency to reduce overall demand. And of course there was support for continuing research, particularly on safety issues at all stages of the nuclear fuel cycle and in the design and performance of small modular reactors.

More interesting, not a single factual disagreement arose during the two-hour conversation. Nobody claimed that waste storage demonstrably poses large and inevitable risks to the public, or that the waste problem has been solved. Nobody claimed that future Fukushimas and Chernobyls are practically unavoidable or that they are virtually impossible with current safeguards. There was really nothing to argue about, except what the future will look like!

Those arguing from nuclear's necessity or desirability were fairly confident that future costs will drop substantially, that construction can be expedited, and that safeguards can be developed and put in place to insure public safety. Those arguing from the perspective of nuclear power's dangers or impracticalities believe future costs will remain prohibitive, risks will remain unacceptably high, and baseload requirements can be met without nuclear power. These diverging views of the future primarily reflected different wishes, not possession of or belief in different facts. A fact checker cannot mend these differences.

The main take-home message from the conversation was the extent to which only unabashed speculation separated the two viewpoints on nuclear: one side speculates that the price will come down, that terrorists can be prevented from intercepting nuclear fuel supply chains, and that expanded nuclear power will not dangerously increase the likelihood of nuclear war; the other side speculates that the price will remain non-competitive, diversion of nuclear materials will remain a serious threat, and public opinion will continue to resist this solution. One side speculates that solar and wind cannot meet future baseload power needs, while the other hopes that a modernized grid that coordinates solar and wind power across regions, new developments in storage technology, and future development of deep, dry-rock geothermal for baseload power will be sufficient.

The issue of baseload supply emerged as particularly in need of further analysis. There is a need for more discussion of possible ways in which greater temporal flexibility in electricity use can be promoted and achieved, thereby lessening the need for a large baseload supply. The future role of baseload geothermal energy looks promising, but far more analysis and discussion of that option are needed. And finally, the vulnerability of nuclear power's cooling needs to prolonged and intensive heat waves that could make nuclear power unreliable as a baseload electricity supply also deserves more thought.

Six conversants is not very many. We expect that if many such conversations were held today, some areas of factual disagreement could arise. But the conversation left us confident that the major divide over nuclear power stems from differing speculations about two questions: can the cost of nuclear power and its risks be reduced substantially, and can essential baseload needs be met without it?

Given that differing hopes and fears are what mainly separates the two sides of the nuclear power debate, what should today's energy policy look like? The following is our view, not the consensus from the conversation.

Under uncertainty, some seek to minimize the chance of a worst-case outcome, while others favor policy that promotes a best-case outcome. To minimize the likelihood of a worst-case outcome, we might compare a future in which nuclear power has contributed to the outbreak of nuclear war with a future in ↪

Sudan's conflict escalates, endangering millions

Erik English

Bulletin of the Atomic Scientists, August 14, 2023

With war crimes rampant throughout the country and little hope for a resolution in sight, the two warlords that have been fighting for national control of Sudan since April show no signs of stopping. Sudan is already one of the most vulnerable and least prepared nations in the world to respond to the effects of climate change, a challenge that is exacerbated by poor governance and prolonged conflict.

Since the start of the conflict, basic services have become scarce and expensive; more than 3.5-million people have been displaced, 80 percent of the country's hospitals have shut down, and the International Criminal Court launched an investigation into the violence in Darfur. The coming rainy season will bring flooding and make disease outbreaks of cholera, dysentery and polio more likely. Measles outbreaks have already resulted in the deaths of at least 13 children and the latest Integrated Food Security Phase Classification revealed that more than 20 million people face acute food insecurity, of whom six million are only one step away from famine.

Much of the news coverage has focused on Khartoum, where guerrilla warfare broke out in the streets, but as the war has dragged on, the violence has continued to spread throughout the country. Decades of war have made Sudan's institutional systems weak, and the current conflict compounds the challenges — such as food insecurity and disease outbreaks — that the Sudanese will continue to face in the future.

At the root of the conflict is a struggle to become heir to the dictatorship of Omar al-Bashir, who was overthrown in 2019. Negotiations to schedule an election and establish a democratically elected government have been underway for years, with a framework agreement negotiated as recently as January. However,

Nuclear power – *continued*

which the economy is at times severely disrupted by a lack of sufficient base load power. That unhappy choice would compel most people to plan for a non-nuclear future. To maximize the likelihood of best-case outcomes (safe and affordable nuclear power; solar, wind and enhanced efficiency, with sufficient baseload supply), the much lower land requirement for nuclear power should be compared with the inherent advantages of decentralized energy systems — systems less vulnerable to human error. In this light, a nuclear future is not the clear choice today in either worst or best cases.

Moreover, solar and wind power are rapidly expanding today, but around the world their output is generally far below the level at which inadequate baseload is limiting their use. Thus, in the interests of reducing the climate threat, it makes sense now to greatly and rapidly increase investment in the deployment of those technologies while investing in a modern grid and improved storage technologies.

Further research and development may provide persuasive evidence that baseload power needs can be met in a carbon-free, non-nuclear future. It might also show that both the cost of nuclear power and its hazards can be greatly reduced. Research and development are the only way to replace with facts the hopes and fears that currently dominate the debate.

– *edited from Bulletin of the Atomic Scientists, October 6, 2023*

fighting broke out after the deputy of the current de facto president objected to how and when his militia would be incorporated into the national army. Multiple ceasefires have been brokered by the United States and Saudi Arabia, but none has provided a lasting end to the violence, which is fueled by decades long ethnic tensions that continue today.

Geographically, Sudan is situated at the crossroads of Africa and the Middle East. Much of its recent history has been fueled by ethnic tensions between those identifying as African and those identifying as Arab, identities which were fostered by British colonialists. In 1989, Omar al-Bashir came to power in a coup that enforced Islamist principles throughout the nation. Nomadic Arab herders had been driven onto African farmlands by drought and desertification, creating conflict over resources with the non-Arab Sudanese. In 2003, non-Arab Sudanese herders in the Darfur region formed a rebellion to end their decades-long economic marginalization by al-Bashir's Islamist government.

The uprisings in the Darfur region were brutally put down by al-Bashir, who enlisted an Arab militia of camel traders known as the Janjaweed. For years, these government-sanctioned militias backed the Sudanese Armed Forces (SAF), summarily executing, raping, and destroying communities throughout one of the poorest and most inaccessible regions in the world. One of the Janjaweed militants who caught the eye of then-president al-Bashir was Mohamed Hamdan Dagalo, known as "Hemedti."

Alex de Waal, director of the World Peace Foundation, has pointed out that when South Sudan declared independence and became an independent state in 2011, the country became two African nations with ethno-linguistic diversity. However, the ruling class in north Sudan didn't see it that way, instead preferring to view an African South Sudan and an Arab, Islamist north Sudan. As such, ethnic tensions continued to drive conflict in areas that didn't identify as Arab.

Trying to address the reemerging conflicts and to dilute the power of the national army, thereby reducing the likelihood of a military takeover, al-Bashir formalized the Janjaweed militias as the Rapid Support Forces (RSF) in 2013 with Hemedti at the helm. The RSF continued its brutal crackdown in Darfur and throughout Sudan, even sending troops to Yemen to fight against the Iran-backed rebels on behalf of a Saudi-led coalition.

Ever the opportunist, in 2019, Hemedti turned on al-Bashir and helped overthrow him in a coup alongside the SAF and its leader, Abdel Fattah al-Burhan. A civilian-military partnership to organize democratic elections was formed a few months later, with al-Burhan as the head of the military's transition council. In 2021, al-Burhan and Hemedti organized another coup to oust the civilian council and maintain military control over Sudan.

Since then, the SAF and RSF have negotiated with pro-democracy forces to incorporate the RSF into the SAF and schedule democratic elections. That is, until Hemedti withdrew from the negotiations on April 15th and violence erupted in Khartoum, then rippled through the rest of the country.

Mai Hassan, a professor of political science at MIT, blamed the conflict on differing goals for the shape of the security sector and election timing, which go back to the U.S. and British negotiations after the coup in 2021. In effect, the SAF wanted the RSF to be incorporated into the national armed forces within two years, while the RSF preferred a longer 10-year time frame. According to

Hassan, “The West was pushing them to come to an agreement so quickly. Not nailing down the specifics of what this reform would look like or actually involving a lot of civilian groups in the process was one of the reasons, in my view, that we got this outbreak of violence, even if, probably, we were going to get here regardless.”

The SAF possesses tanks, planes, and high-tech weaponry of an established army, while the RSF is fighting a guerilla war in the streets of Khartoum and other cities around Sudan. The RSF controls gold mines in the Darfur regions of the country and has recruited soldiers by offering higher pay than the SAF. While the SAF still has a clear technological advantage, the RSF has begun to deploy armed drones, and the technology gap will continue to shrink, especially as regional actors start to throw weight and money around.

Recognizing the risk that the conflict would devolve into a proxy war involving regional powers, the United States quickly began negotiating for a ceasefire after the outbreak of hostilities. Those negotiations, spearheaded by the United States and Saudi Arabia, have so far failed, and the prolonged conflict has indeed become a proxy war. As de Waal puts it, “Sudan has become part of the security perimeter of the gulf states.”

The involvement of other countries isn't a new phenomenon in Sudan, where regional powers have been battling for influence for decades, primarily over Islamist governance systems.

The Muslim Brotherhood has been an active and influential force in Sudan since Omar al-Bashir took power in 1989. Turkey and Qatar are considered supporters of political Islam and the Muslim Brotherhood, while the United Arab Emirates (UAE) and Saudi Arabia oppose Islamic political ideologies. Egypt and Turkey have allied with al-Burhan and the SAF, while the UAE has thrown its support behind Hemedti and the RSF.

Meanwhile, Western nations are concerned about the emergence of a Russian base in Sudan, located on the Red Sea, which both al-Burhan and Hemedti have signaled their openness to.

The possibility of a wider and more intractable war is not theoretical. A Libyan warlord, Khalifa Haftar, has provided training to the RSF for its guerilla war, and in April, the Guardian newspaper described his continued involvement as a “nightmare scenario” with “multiple regional actors and powers fighting a proxy war in the country of more than 45 million people.” Meanwhile, Egypt has sent planes and soldiers to fight on behalf of the SAF.

The Sudan conflict risks exacerbating the humanitarian crisis across the Horn of Africa region, where millions remain in need of food assistance. Thousands of South Sudanese refugees fled into Sudan after a civil war in 2013; now thousands of them are fleeing conflict again, returning home to South Sudan amid more violence and uncertainty. The new fighting in Sudan has led others to flee to Chad, Egypt, and other countries in the Horn of Africa, where a devastating drought and prolonged conflict have left many on the verge of famine.

As of August 7, more than three million people have been displaced within Sudan and nearly 900,000 refugees, asylum seekers, and returnees have fled the country. In late July, Norway, the United Kingdom, and the United States released a joint statement to “condemn in the strongest terms the ongoing violence in Darfur, especially reports of killings based on ethnicity and

widespread sexual violence by the Rapid Support Forces and allied militias.” The Famine Early Warning System Network (FEWS Net) has warned that the looting of humanitarian supplies, the targeting of aid workers, the diversion of assistance by armed groups, and bureaucratic obstacles will continue to interfere with aid efforts.

The projected costs of this summer's extreme heat: 235,000 Emergency Room visits, 56,000 hospital admissions — and \$1 billion.

Hospitals and health centers through the country have shut down, and the destruction of the health infrastructure has led to an increased occurrence of disease and malnutrition. As of July 28, disease outbreaks of malaria, measles, dengue, and acute diarrhea have all increased. The World Health Organization expects more deaths from outbreaks to emerge as health services collapse. The conflict has also made it difficult to deliver medicine and therapeutic treatments for Sudanese suffering from tuberculosis. The executive director of the Stop TB Partnership called the collapse of the health services a “ticking time bomb.” In late April, armed forces took control of a public health laboratory that housed pathogens like polio and cholera.

As the scale of the suffering continues to climb, the U.N.'s Office for Coordination of Humanitarian Affairs announced that Sudan's humanitarian response plan, an estimate of the required efforts and associated costs to meet humanitarian needs, has increased by \$800 million, to \$2.56 billion, anticipating 18-million people in need by the end of the year.

So far, U.S. and Saudi efforts to encourage a negotiated settlement to the Sudan fighting have resulted in little but short-term ceasefires, followed by renewed fighting. Negotiations should continue to seek a peaceful resolution to the violence, but that is the first of many problems Sudan will face in the future. As de Waal puts it, if Hemedti and the RSF prevail, the state will be dismantled; if al-Burhan and the SAF prevail, the state will continue on a trajectory of rot and decay.

Either way, the state that remains will be incapable of addressing the challenges of climate change, disease, and food insecurity. “The real challenge in Sudan is not so much getting at a ceasefire between these two belligerents, these two monsters,” he said, “but how we see preserving the remnants of that state and moving ahead with an agenda of state reconstruction.”

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“Today, the scale and horror of modern warfare — whether nuclear or not — makes it totally unacceptable as a means of settling differences between nations. War should belong to the tragic past, to history; it should find no place on humanity's agenda for the future.”

~ Pope John Paul II

Three should be no Saudi uranium enrichment

Victor Gilinsky

There is increasing talk of a United States-brokered “grand bargain” on Middle East security, the core of which would be normalization of ties between Israel and Saudi Arabia. It isn’t clear what motivates President Joe Biden to press for this deal now. The obvious goal would involve the eternal search for peace in the Middle East, but there are hints that such a bargain may have more to do with keeping the Saudis out of China’s orbit. One thing we know, Biden’s lieutenants are lobbying hard in the Senate for acceptance of some version of far-reaching demands from the Saudi crown prince, Mohammed bin Salman, among them access to uranium enrichment technology that would ostensibly provide fuel for future Saudi nuclear power plants. Indeed, enrichment is a step in the production of nuclear reactor fuel. It is also a vital part of one of two paths to the atomic bomb.

As always, the “realists” argue that we can’t be too fastidious about our partners. If we refuse to accommodate Saudi nuclear aspirations, then Russia and China will step in, and we will have less influence in the Middle East. But the record of “realistic” foreign policy is not so great, either. Indulging the crown prince in his illicit quest is just too dangerous.

The crown prince hasn’t been shy about revealing how he may use a civilian nuclear power project. In a 2018 CBS News interview he said, “Saudi Arabia does not want to acquire any nuclear bomb, but without a doubt, if Iran developed a nuclear bomb, we will follow suit as soon as possible.” Will he wait for that development? He made no mention of working through the international system to prevent an Iranian bomb. He wants a nuclear power program on a hair trigger, ready to convert quickly to a nuclear weapon program.

Of course, that isn’t the polite version of the crown prince’s plan. He says he wants to use domestic uranium, of which the Saudis claimed to have large deposits, to fuel civilian nuclear power reactors. He wants to produce fuel domestically, therefore, he needs to acquire enrichment technology. But despite Saudi claims, there are no significant uranium deposits in the country. Recent reports reveal that the teams of geologists sent to search for it have turned up empty-handed. That hasn’t, however, caused the crown prince to lose interest in enrichment, which is itself a revealing fact about his intentions — and his reliance on American greed. To cope with what the Saudis regard as excessive suspicion of others, they have suggested they are open to accepting some modest additional oversight arrangements, which they cynically expect Congress to accept after members engage in some ritual hand wringing.

You would think the Saudi insistence on inclusion of enrichment, no matter how restricted, would be a non-starter for a U.S.-Saudi “123” agreement for nuclear cooperation. (Compliance with Section 123 of the Atomic Energy Act is essential for any significant U.S.-Saudi nuclear trade. But such common sense is a thin reed to lean on when it comes to Washington nuclear politics. Powerful lobbies have been pushing for years for sale of power reactors in the Middle East and for generous subsidies to allow this to happen. The departments of Energy and State will be supporting this, too, claiming that international “safeguards” would be effective in preventing misuse of civilian nuclear facilities. The official line on nuclear energy is still “Atoms for Peace,” as it has been since President Eisenhower’s 1953 speech. Recall that

George W. Bush said even Iranian power reactors, by themselves, were perfectly legitimate.

The problem is that hardly anyone in Congress has any real understanding of nuclear technology. The members are swept off their feet by promises of safe, non-carbon producing energy sources, especially when nuclear proponents use adjectives like “small” and “modular” and “advanced.” Congressional discussions on international aspects seldom get beyond “restoring America’s competitive advantage in nuclear energy.”

There is also little understanding of the limitations of international “safeguards,” the inspection system of the International Atomic Energy Agency (IAEA). Is there any realistic recourse if the Saudis break the rules? It is indicative of Saudi Arabia’s attitude toward the IAEA that it has used every stratagem to minimize its safeguards responsibilities. The minimization strategy does not violate IAEA requirements, but a country anxious to demonstrate its nuclear bona fides should be more forthcoming in its nonproliferation cooperation.

The 2008 U.S.-India civil nuclear agreement is an eternal warning about how American international nuclear policy can go off the rails when the president and Congress are swept away by visions of gaining an ally against China plus the prospect of dozens of power reactor sales. That agreement ran a truck through the Non-Proliferation Treaty, and none of the sales of nuclear power plants materialized.

The Saudis know Americans can be made to swallow principle — they recently succeeded in humbling the U.S. president on human rights and oil prices — and so are unlikely to soften their stance on inclusion of enrichment in a 123 agreement. The White House will be looking for a formula that accepts it, but adds some restriction, or appearance of restriction, or another sweetener, perhaps related to Palestinian rights, that would allow members of the House and Senate to go along with inclusion of enrichment in a U.S.-Saudi agreement.

Who would stand in the way? Not the Republicans. They love the Saudis. The one possibility is if Israel balks at any deal that includes Saudi enrichment. Israeli opposition leader Yair Lapid told Democratic Party lawmakers visiting Israel recently that he opposes a potential Israel-Saudi Arabia normalization deal that allows Riyadh to enrich uranium because it would harm Israel’s security. But the Israeli government’s response — that is, Prime Minister Netanyahu’s — has been ambiguous.

Somebody needs to stand up. Not only should the United States say no to Saudi enrichment, but Washington should also rethink the entire notion of nuclear power reactors in Saudi Arabia. Such reactors, coupled with a reprocessing facility to extract plutonium from used fuel, which the Saudis will surely want as well, provide the other path to a bomb, a plutonium bomb.

With its constant threat of wars, the Middle East is no place for nuclear reactors. Nuclear reactors in the region have been targeted in aerial attacks a dozen times. The safety issues that followed the capture by the Russians of the Zaporizhzhia power reactors in Ukraine should teach us something, too. Nuclear reactors do not belong in regions of potential conflict.

The ultimate argument against a U.S.-Saudi nuclear deal is the crown prince himself, who is in line to be king and for practical purposes already is. He is a liar and a killer for approving the gruesome assassination of journalist Jamal Khashoggi. Saudi

Arabia, for all its modern trappings, is a primitive state with no effective checks on his powers. The king makes the laws, rules by decree, and is the chief judge. He has powers the British king gave up in the 13th century. Saudi Arabia has a long way to go before it will be a safe place for nuclear energy.

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“Today, the scale and horror of modern warfare — whether nuclear or not — makes it totally unacceptable as a means of settling differences between nations. War should belong to the tragic past, to history; it should find no place on humanity's agenda for the future.”

~ Pope John Paul II



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