

TIMMON WALLIS



2024 SUMMARY

WARHEADS TO WINDMILLS

PREVENTING CLIMATE CATASTROPHE AND NUCLEAR WAR

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Maps created with MapChart.net

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WHAT NEEDS TO HAPPEN?





INTRODUCTION

Nothing can be more important than stopping a war if you happen to be caught in the midst of one. And nothing can be more important than stopping the persecution of trans people if you happen to be one.

For people who live on the receiving end of inequality, injustice, violence and oppression, these are potentially life-threatening emergencies that need immediate attention. And there are a lot of people suffering right now from a lot of different problems.

It may take a gargantuan effort and an unprecedented uniting of forces across many existing divides to address some of these problems. And it may take a complete overhaul of social and economic systems created over centuries that benefit certain groups of people at the expense of others. But these are systems that humans have created and humans can change.

First, however, humanity itself must survive.

Unless we take swift and decisive action to reduce global carbon emissions and the threat posed by nuclear weapons, the consequences will be life-threatening, not just for certain vulnerable groups but for all of us - and potentially for the entire web of life on this planet.

Our survival is not guaranteed.

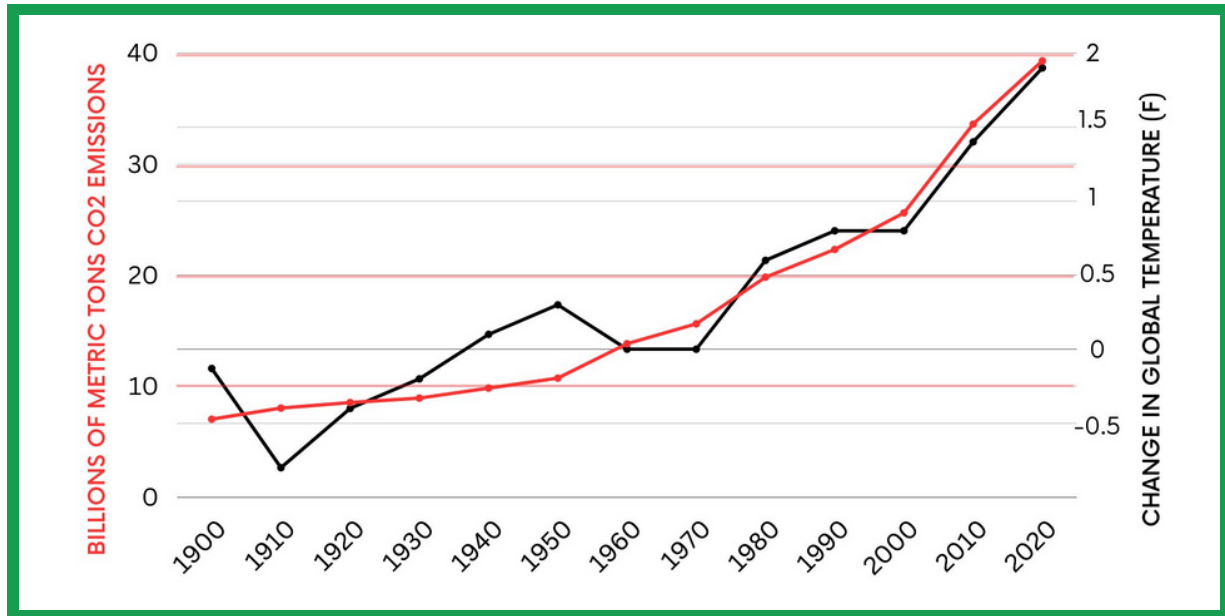
This is the choice before us as we approach the impending disasters of climate change and nuclear war: will the people of the United States and the world rise up and demand that we address these life-threatening emergencies as our absolute top priority?

Nothing we have ever faced in all of human history is as important as what we do now in the face of these two global life-threatening emergencies.

The solutions exist. We can do this.



THE CLIMATE CRISIS



Global temperatures have already increased by approximately 1.1°C (2.0° F) since the start of the industrial age. Carbon dioxide levels in the atmosphere are now higher than they have been for at least one million years.

The Paris Accords (2015) committed every country in the world to preventing global warming from reaching 2°C (3.6° F). But many campaigners felt that even 2°C was too high to prevent runaway climate change.

We cannot predict exactly what will happen if the earth continues to heat up. We do know, however, that increased temperatures cause increased drought, leading to catastrophic crop failure across all major grain-producing areas of the globe.

Even 1.5°C of global warming will have serious consequences. Going beyond that is now too dangerous to contemplate.

In November 2018, the Intergovernmental Panel on Climate Change (IPCC) confirmed their worst fears. The verdict is that allowing global temperatures to increase to 2°C above pre-industrial levels will create catastrophic instabilities and extremes in global weather patterns.

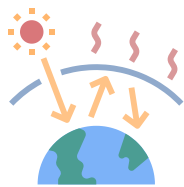
Other possible effects of uncontrolled climate change include the **collapse of ecosystems**, the **mass extinction** of species, **mass migration** of people as coastal areas flood and extreme temperatures make areas of the world uninhabitable, and **extreme weather events** causing even more migration and disruption, as well as physical damage costing trillions of dollars to the global economy.

The most recent IPCC report, released in March 2023, has reiterated the dire warning that unless the world makes drastic and immediate cuts to global carbon emissions, we are heading towards a climate catastrophe.



PREVENTING CLIMATE CATASTROPHE

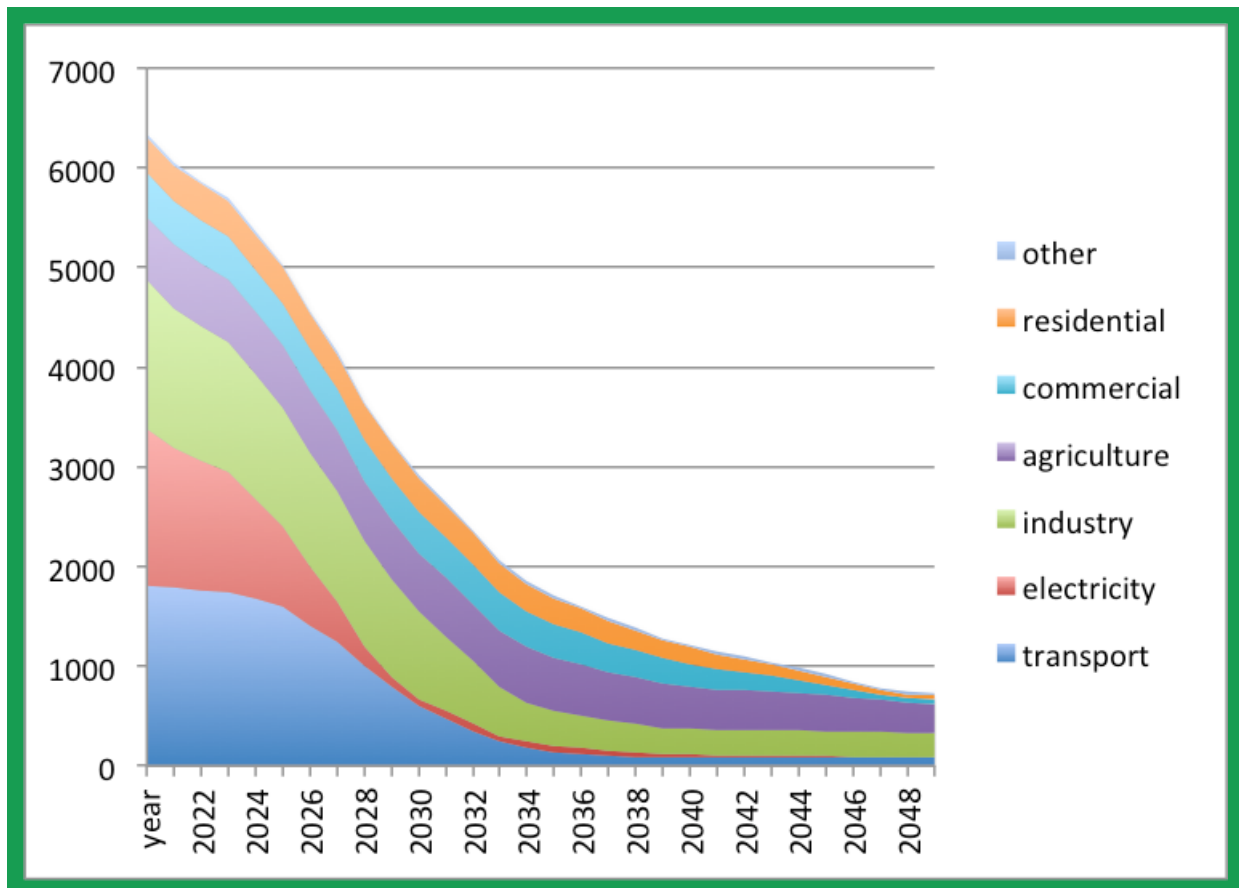
In order to keep global warming to no more than 1.5°C above pre-industrial levels, we need to achieve a 45% cut in global carbon emissions (from 2010 levels) by 2030, reaching a target of net-zero carbon emissions by 2050.



There is really only one way to cut emissions to the extent required by 2030, and that is by moving swiftly to carbon-free electricity, transportation and heating.

Other steps required to reach net-zero emissions over the next 30 years include major changes to industrial and agricultural practices. But unless we take these hugely important first steps (and make headway on the others) in the very immediate term, we will be heading directly towards climate catastrophe.

Reducing Carbon Emissions 2023-2050

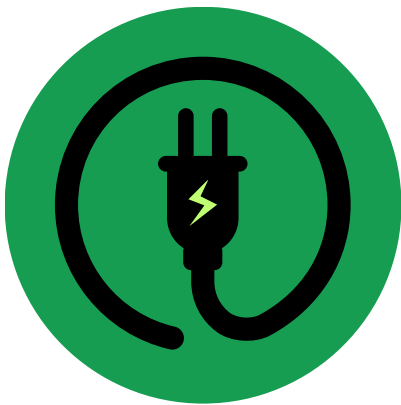




CLIMATE BY NUMBERS

The IPCC target for the United States is to be producing no more than 3,850 million metric tons (MMT) of carbon emissions by 2030. In 2021, the US emitted roughly 6,350 MMT of carbon, so that means we need to reduce our carbon emissions by 2,500 MMT to reach a goal of 3,850 MMT by 2030.

The three largest sources of carbon emissions in this country are **transportation** (currently pumping out 1,800 MMT of carbon per year), **electricity generation** (pumping out 1,585 MMT of carbon) and **industry** (pumping out 1,487 MMT of carbon). These three sectors account for nearly 80% of our total carbon emissions.



The **easiest** sector to tackle first is the production of electricity. It is completely within our reach to produce no electricity from fossil fuels by 2030 (leading to 100% electricity from wind, water and sun by 2050). This would reduce carbon emissions by around **1,500 MMT** by 2030.



Although we hear a lot about the carbon emissions from air travel, in fact commercial flights account for less than 2% of our total carbon emissions. Cars and trucks, on the other hand, account for more than 20% of our total emissions and 80% of the emissions from the transportation sector. Moving swiftly to electric vehicles by 2030 could reduce US carbon emissions by at least **500 MMT** by 2030, and **1,800 MMT** by 2050.

To reach our 2030 target, we need to cut a further **500 MMT** from industrial emissions. These can come from closing down remaining coal mines (50 MMT), closing down oil fields (75 MMT), closing down gas pipelines and other gas infrastructure (200 MMT) and expediting the replacement of HFCs as a refrigerant (175 MMT). Other measures must already be in place to continue the carbon reductions needed to reach net-zero by 2050.



THE NUCLEAR THREAT

Just as the climate scientists have been warning for decades about the dangers of global warming, so the nuclear scientists have been warning for decades about the dangers of nuclear weapons. Exact figures to represent the growing risk of nuclear war are impossible to compute, but every year, the Bulletin of Atomic Scientists publishes their “doomsday clock” to show just how close to the midnight of doomsday they collectively think we are. In January 2023, the clock was moved to 90 seconds to midnight, the closest it has ever been to doomsday.

WHY IS THE DOOMSDAY CLOCK GETTING SO CLOSE TO MIDNIGHT?





THE NUCLEAR NIGHTMARE



By now, most people in this country are aware that climate change is a life-threatening emergency. They may be at least dimly aware that a full-scale exchange of nuclear weapons would be the end of human civilization as we know it, and possibly of all life on earth.

The belief that the world can continue to hold onto nuclear weapons indefinitely without ever using them is just as dangerous as the belief that we can go on burning fossil fuels indefinitely without causing a climate catastrophe.

This is not a distant, far away threat. This is an immediate, life-threatening emergency.

It is not just the possibility of nuclear war that poses an extreme threat to human civilization. **Just one detonation** in a city, by accident or on purpose, would kill millions. The immediate casualties would overwhelm the response capacity of the entire global Red Cross/Red Crescent movement and overflow every burn bed in every hospital on the planet. Women, girls and fetuses would suffer the most from ionizing radiation. Food and water would be toxic for generations. There is no possible military or political agenda worth such a risk.

These weapons break down, they have faulty parts, they malfunction, they get lost. The people who look after them make mistakes, they fall asleep on the job, they take drugs on the job, they forget how to do their tasks.

In 2007, 6 US nuclear weapons went “missing” for several hours because they were loaded onto the wrong plane and sent to the wrong base in the wrong state. In 2013, 17 officers with nuclear launch authority were stripped of their duties due to weapons safety rule violations. In 2016, 14 airmen guarding nuclear missiles were disciplined for drug offenses.

As many as 50 nuclear weapons currently lie at the bottom of the sea. They have sunk with submarines, rolled off ships, or been jettisoned from airplanes.

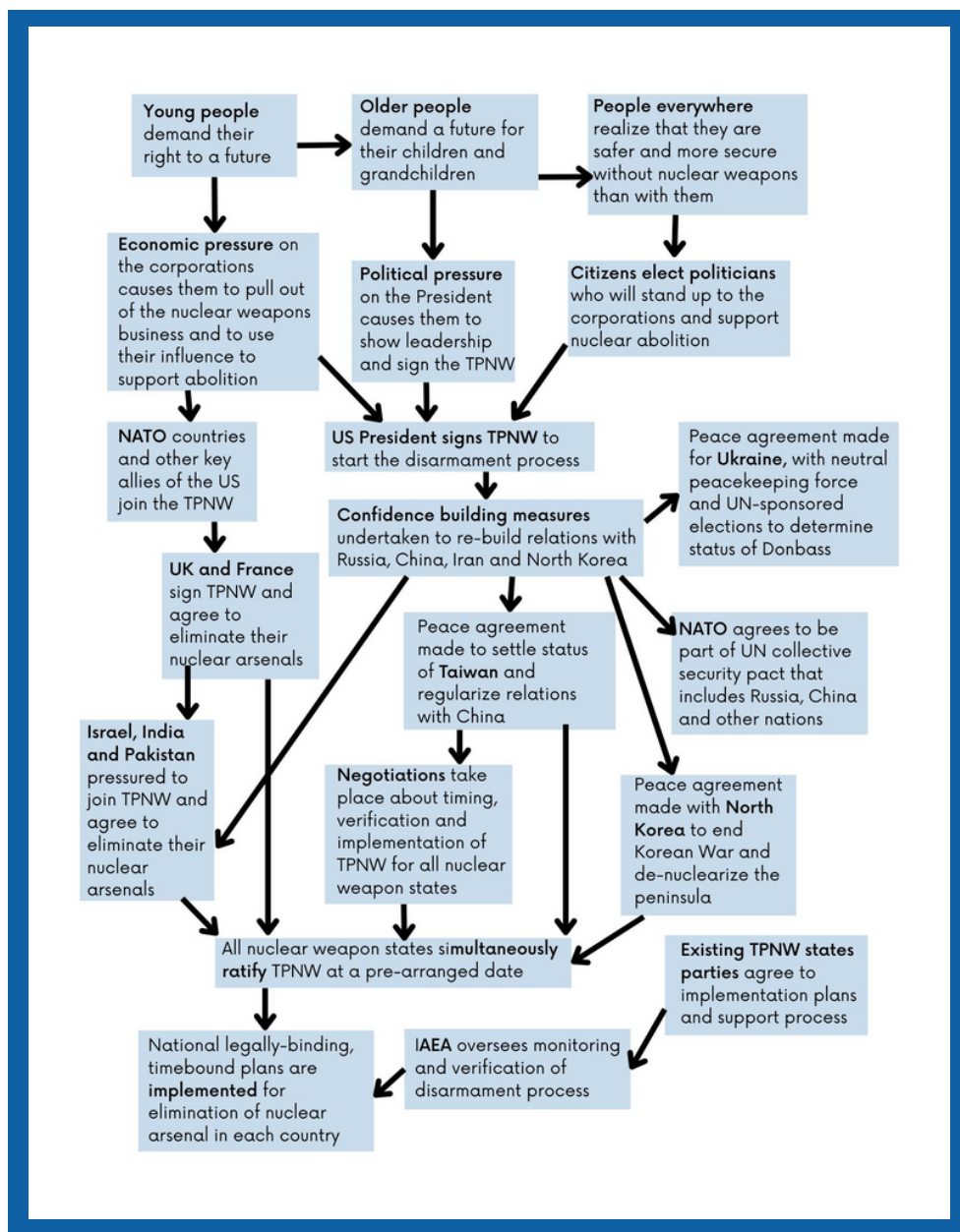
Nearly 2,000 out of a stockpile of 7,000 US nuclear weapons are standing by, 24 hours a day, on “hair-trigger” alert, ready to be launched at a moment’s notice with an order from the President, or even through the actions of a rogue military officer with access to the launch mechanisms.



PREVENTING NUCLEAR WAR

There are many ways to reduce the risk of nuclear war, but there is only one way to reduce that risk to zero, and that is to completely eliminate the weapons. Many other weapons, including chemical and biological weapons, have been banned by international treaty, and have either been eliminated by now or are very close to being eliminated.

Nuclear weapons can kill and maim hundreds of thousands of people and destroy whole cities. But they cannot stop a single nuclear weapon from landing on our country. Only the total elimination of all nuclear weapons worldwide can do that.





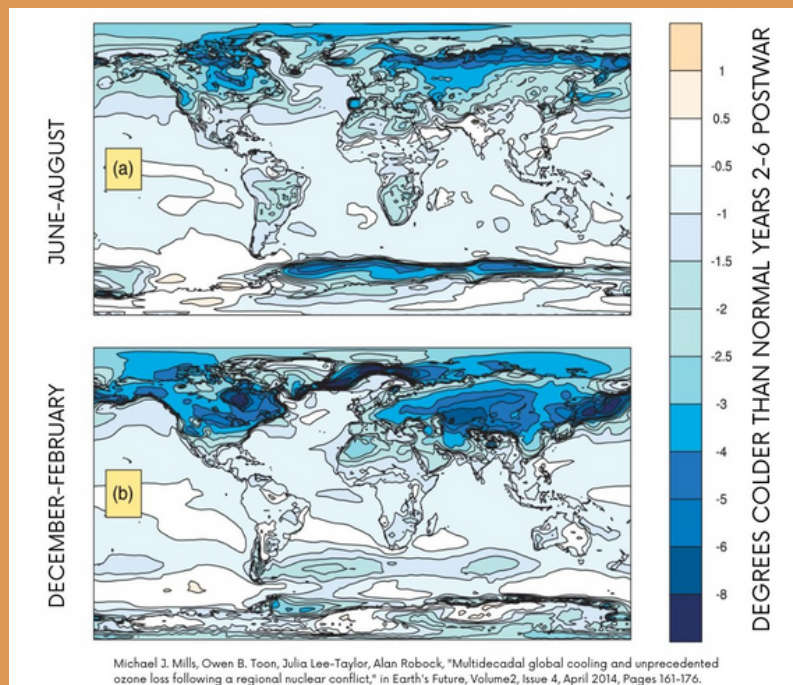
NUCLEAR WEAPONS: A CLIMATE ISSUE

Nuclear weapons not only destroy entire cities. They produce vast amounts of poisonous radiation. We know from disasters like Chernobyl and Fukushima how fast and far radioactivity can spread, affecting people many thousands of miles away. Radioactive particles get into the air we breathe, the water we drink, and work their way up the food chain. People eventually die – years or even decades later – from cancers and other effects of radiation poisoning.

The likely impact of a full-scale exchange of nuclear weapons between the US and Russia would cause as much as 150 million tons of soot to be blasted into the upper atmosphere, **lowering global temperatures by as much as 7°C (12°F)** for an extended period of time, potentially plunging major food-producing regions of the world to below-freezing temperatures for several summers in a row and causing **widespread famine**. A smaller war would still be devastating (see below).

The possible use of nuclear weapons is therefore also a climate issue. The risk to human civilization and to the planet is roughly equivalent, whether the earth is suddenly overheated as a result of fossil fuel burning or suddenly overcooled as a result of nuclear war. In either case, billions of people would die of famine, and the underlying ecosystems we all depend on would be at serious risk of collapsing.

POTENTIAL CLIMATE EFFECTS OF A "LIMITED" NUCLEAR WAR BETWEEN INDIA AND PAKISTAN



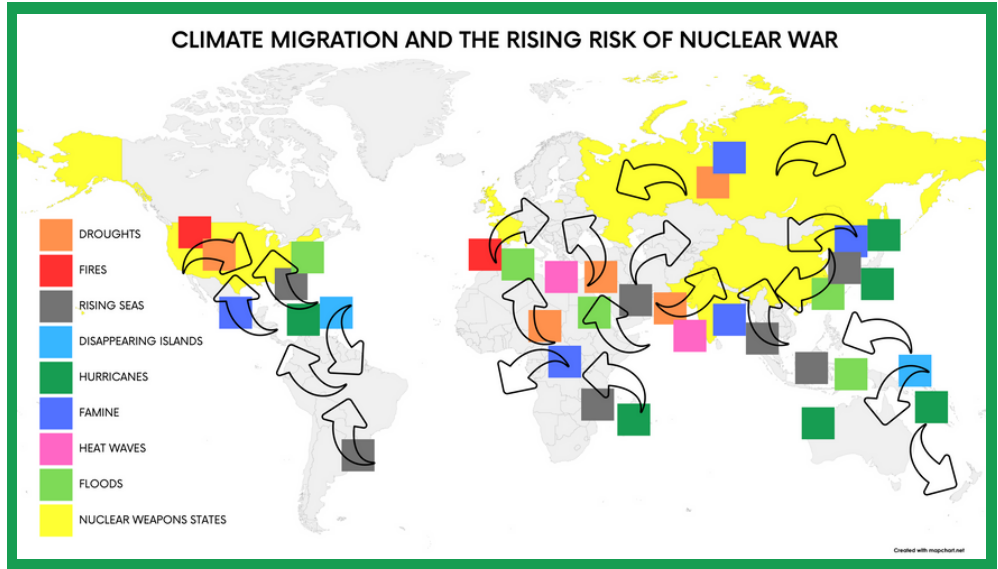
In a limited, regional nuclear war between India and Pakistan, 5 Tg of black carbon could self-loft to the stratosphere, where it would spread globally, producing a sudden drop in surface temperatures and intense heating of the stratosphere.

Other potential effects:

- Global ozone losses of 20%–50% over populated areas
- Coldest average surface temps in the last 1000 years
- Growing seasons reduced by 10–40 days/year for 5 years
- Surface temps reduced for more than 25 years
- Combined global cooling and enhanced UV
- Global nuclear famine



CLIMATE: A NUCLEAR WAR ISSUE



Rising sea levels could displace millions of people in countries like Bangladesh, Nigeria and Indonesia, causing mass migrations and social upheaval on a scale not yet seen. This will place enormous pressures on neighboring countries to house and feed climate refugees, while their own economies begin to suffer from the effects of climate change.

Increasingly powerful hurricanes and other extreme weather events will continue to cause widespread destruction of property and billions of dollars in damages. Together with floods, wildfires, mudslides, extremes of hot and cold temperatures and other drastic changes of global weather patterns will surely lead to conflicts over access to resources.

A worsening global climate will significantly increase the likelihood of global conflicts over resources, including nuclear war.

The costs of replacing lost goods and property, lost production and revenues, and repairing damage will affect the US economy and fuel military interventionism to secure markets and resources.

With China, India and Pakistan likely to be among the most severely affected by rising sea levels in particular, the risk of serious conflict among these 3 nuclear-armed countries will only increase with time.

And there can be little doubt that global pressures from climate change on the economies of Europe and North America will exacerbate existing tensions with Russia, ever raising the risk of a nuclear war.



PROBLEMATIC APPROACHES: NUCLEAR WEAPONS

There have been many brave attempts to reduce the risk of nuclear war over the past 77 years, starting with the very first resolution passed by the United Nations General Assembly in 1946, calling for nuclear weapons to be banned. But when we know that even the smallest risk of nuclear war is a risk too great, why would we demand anything less than the complete elimination of these weapons?

NONPROLIFERATION

By 1968, the US, Russia, China, UK and France signed the Nuclear Non-Proliferation Treaty (NPT), promising to negotiate the elimination of their own nuclear weapons in exchange for the other 190 or so countries of the world promising not to acquire them. But how long will other countries keep their promise when the nuclear armed nations refuse to disarm?

ARMS CONTROL

Other treaties were later agreed upon to stop certain kinds of nuclear testing, to control certain types of nuclear weapons, and to create a general "parity" between the two biggest nuclear arsenals (the US and Soviet Union). This tactic continues to be the main thrust of arms control enthusiasts, but it does not challenge the rationale for the indefinite existence of nuclear weapons.

NUCLEAR FREEZE

As the nuclear arms race continued to spiral out of control during the Cold War, there were demands to freeze arsenals at their existing levels and promises not to build any more nuclear weapons or develop new capacities for existing weapons. Today, calls for a nuclear freeze are outdated and inadequate.

MINOR POLICY CHANGES

Today, many campaigners and members of Congress are calling for changes to US nuclear weapons policy, including a pledge not to use nuclear weapons first, or to require Congressional authorization for any use of nuclear weapons. However, limited steps and solutions do not get at the root of the problem and can actually help to legitimize its continued existence.

NUCLEAR POWER

Nuclear power plants are heavily subsidized by governments because they produce, as a waste product, the plutonium used for nuclear weapons. The risk of plutonium being diverted to illicit production of nuclear weapons is a significant downside to expanded use of nuclear power, as is the fact that a nuclear power plant is itself a potential nuclear weapon.



PROBLEMATIC APPROACHES: CLIMATE

There are many possible steps that can move us towards a solution to the climate crisis. If we are to prevent climate catastrophe, however, there is simply not enough time to wait for incremental steps to take their course or for activists to be “realistic” about what is or is not politically “possible.” If we know what has to be done in order to survive, why would we fight for less than that?

COAL TO GAS

Among fossil fuels, coal is the worst carbon emitter. The Beyond Coal campaign of the 2010s was largely successful, but resulted in the replacement of coal plants with gas-fired plants. Using gas can reduce carbon emissions to an extent, but since gas is also a carbon-emitting fossil fuel, this approach cannot possibly reduce emissions to the levels needed to prevent climate catastrophe.

BIOFUELS

Biomass is the burning of wood, agricultural waste or other forms of waste, such as municipal solid waste. Producing up to 150% more CO₂ per MW of electricity than coal-fired plants, biomass and biofuels (made from corn, vegetable and animal fats or manure) are not “clean” fuels. They produce more CO₂ emissions than fossil fuels, and are thus not a “solution” to the climate crisis.

CARBON CAPTURE

Carbon capture and storage (CCS) attempts to remove the CO₂ from the emissions of fossil fuel facilities and store it underground where it can't contribute to climate change. Ironically, the only currently viable CCS projects use captured carbon to pump more oil and gas out of the ground. This process simply does not get to the heart of the problem - burning fossil fuels.

MINOR POLICY CHANGES

Limited steps and solutions that don't get at the root of the problem help to legitimize continued burning of fossil fuels. Carbon “cap and trade” and other “carbon offsetting” schemes, for example, allow companies to “buy” someone's cleaner emissions in exchange for their dirty ones, never fundamentally addressing the need to eliminate our reliance on fossil fuels once and for all.

NUCLEAR POWER

Nuclear power generates electricity without emitting greenhouse gases, and is thus considered a “clean” option by some. However, it produces various radioactive waste products, which can remain harmful for tens of thousands of years. Plus, as uranium ore supplies dry up, the amount of electricity required to make the ore useable exceeds the amount of electricity it will ever produce.



BAN NUCLEAR WEAPONS!

In order to discourage other countries from developing their own nuclear weapons, the five nuclear armed nations committed themselves in the 1968 NPT to negotiate “in good faith” and “at an early date” the complete elimination of their nuclear arsenals. When the NPT came up for review in 2000, many countries complained that these legally-binding obligations had still not been carried out. In response, the original five nuclear-armed nations (now there are 9) gave their “unequivocal undertaking” to the rest of the world that they would fulfill their obligations, and every US President since then has renewed this pledge.

And yet, there is no sign whatsoever of the US or any of the other nuclear-armed nations being willing to give up their nuclear weapons. On the contrary, they claim that “security conditions are not conducive,” “the time is not right,” “we are not ready,” while plans are made and budgets are set that envisage the US retaining nuclear weapons into the indefinite future.

But just as the world is rising up to demand action on climate change, the world has also been rising up to demand the elimination of nuclear weapons. Since the end of the Cold War, people in the US have largely forgotten about this issue. But not so in the rest of the world.

These weapons are in the hands of just nine countries, but the whole world would be affected if any were ever used.

NUCLEAR BAN TREATY

After 72 years of waiting for the nuclear-armed nations disarm, the world took matters into its own hands. In 2017, 122 countries at the UN adopted the Treaty on the Prohibition of Nuclear Weapons (TPNW), or “Nuclear Ban Treaty.” This treaty outlaws everything to do with these weapons for all time.

- Each nuclear country that ratifies must remove all of its nuclear weapons from operational status, including those on submarines and ICBMs.
- Legally-binding, time-bound plans for the irreversible and verifiable elimination of nuclear weapons must be installed, to be monitored by the International Atomic Energy Agency (IAEA).
- It will become illegal to “assist, encourage, or induce anyone to engage in any activity prohibited under the Treaty,” likely including a prohibition against financing the companies involved in producing the prohibited weapons.



BAN FOSSIL FUELS!

The Paris Agreement of 2015 set an overall target of keeping global warming to no more than 2.0°C above the pre-industrial average, and set as an aspirational goal to limit global warming to 1.5°C. All countries were invited to set their own “Nationally Determined Contributions” (NDCs) to achieve this goal, but there were no requirements set and no means agreed for holding each country accountable to its commitments. Most significantly, there is no mention at all in the Paris Agreement of the elephant in the room, the primary cause of at least 80% of all global carbon emissions into the atmosphere: fossil fuels.

Already in 2015, Pacific island nations were calling for an international moratorium on new fossil fuel developments, and the following year they proposed a treaty that would ban new coal mining projects. At the COP23 in 2017, a grouping of the poorest countries in the world issued a call for a treaty that would phase out production of fossil fuels, and this was followed by the launch in 2019 of a global campaign to create such a treaty. By the time of COP28 in 2023 a total of 12 countries are supporting the fossil fuel treaty.

Meanwhile, a group of governments led by Denmark and Costa Rica have created the Beyond Oil and Gas Alliance (BOGA) to facilitate the managed phase-out of oil and gas production within those countries and beyond. This alliance now consists of 24 members, including two US states (Washington and California).

FOSSIL FUEL TREATY

There are no plans as yet to convene a negotiating conference to adopt a Fossil Fuel Treaty along the lines of the Treaty on the Prohibition of Nuclear Weapons. However, the outlines of such a treaty are already clear:

- As each country ratifies, their first step would be a commitment to stop subsidizing and licensing new fossil fuel extraction and production, including an end to all pipeline construction, fracking and other extraction-related activities.
- There would then need to be legally-binding, time-bound plans for the phasing out of fossil fuel production with a just transition for affected workers and communities agreed by each country.
- As with the TPNW, banning the continued financing and assistance of fossil fuel production can be a powerful tool for further encouraging other countries to comply with the treaty’s goals and encouraging more fossil fuel divestment.



GLOBAL COOPERATION NEEDED

The nuclear-armed nations are also the major carbon emitting nations of the world.

No single country can prevent climate catastrophe on their own. No matter how much the United States reduces its carbon emissions, we will all suffer the consequences of climate change if other countries do not also reduce their emissions at the same time. And emissions cannot be assigned to any one country anyway.

Goods are bought and sold and transferred across the globe. Companies move around to save on labor costs and to avoid higher taxes, but also to avoid environmental restrictions or tougher regulations. Unless countries band together and agree to follow the same course of action, it is literally impossible to address a problem as serious as the climate crisis.

The United States, China, Russia and India account for more than half of the world's total carbon emissions between them. Together with the UK and the EU, these countries are responsible for nearly three-quarters of all the world's carbon emissions.

These are the countries that must work together to save the planet. And these are also the countries that have nuclear weapons pointing at each other.

Nuclear weapons were developed in the context of a global battle to the death between two opposing and mutually exclusive ideologies that divided the world into two blocs at the end of World War II.

We no longer live in a world that is divided so sharply into two incompatible ideologies.

There are many variations of the economic system that all countries now take part in. Apart from our closest neighbors, Canada and Mexico, China is America's largest trading partner, selling more than half a trillion dollars worth of goods to the US each year.

It is now well past time for Americans to acknowledge that our country is not perfect and that other countries, however unpalatable their regimes may be, are not our "enemies" or "adversaries" or even "competitors."

We will only survive as a species if we work together to solve the greatest problems facing us right now, and those include the climate crisis and the nuclear nightmare, as well as the time-bomb of global inequality.

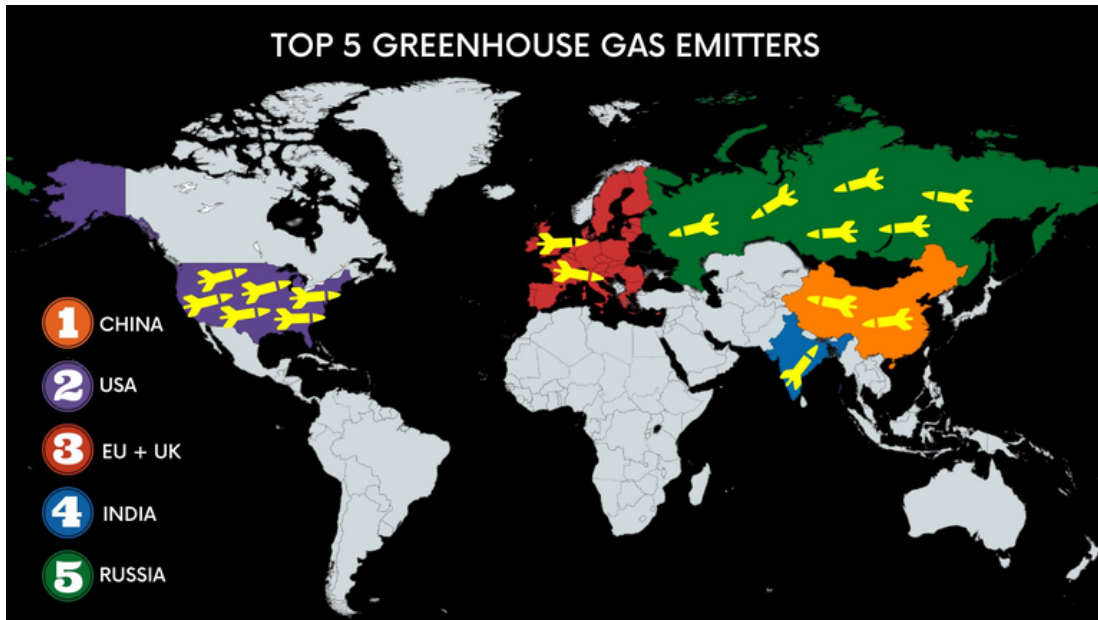
As with all the other issues that currently divide the world and create international tensions, the only solution is to engage in dialogue and to build relations based on mutual respect and a commitment to the principles of the United Nations.

US nuclear weapons are currently targeting the very countries we need to work with to solve the climate crisis.

Just as their nuclear weapons threaten us, so do our nuclear weapons threaten them. Threatening to annihilate each other at a moment's notice with nuclear weapons is not an effective way (continued next page)



STOP THREATENING EACH OTHER



to build trust and cooperation. It merely fuels the fear and animosity that divert national resources into more war and preparations for war, and directly away from the real problems we need to be addressing, like climate.

Nuclear weapons swallow up vast resources and undermine the cooperation and goodwill essential for solving any global issue. They divide the world yet further into “haves” and “have nots,” ultimately threatening the “have nots” with obliteration. We cannot move forward as a world without a more cooperative approach.

International agreements like the Paris Climate Accords are essential for addressing problems that face all of us no matter where we live. But they are also essential for building the cooperation and goodwill needed to sustain a functioning planet.

For 72 years, nations without nuclear weapons were excluded from having any say about these weapons, even though the devastating impacts of a nuclear war would affect them all. The world is just too small a place for nuclear weapons ever to be used by anyone.

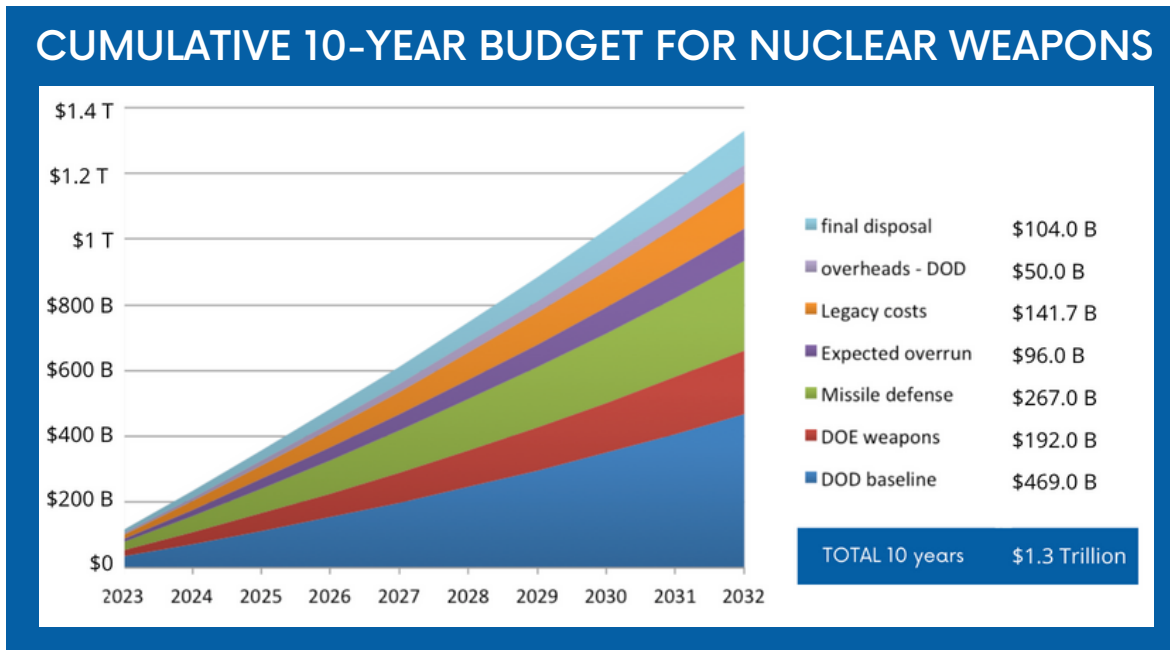
The United States claims that these weapons are “essential” for our security, but this is nothing other than an incitement to proliferation. For if these weapons are essential for the security of the United States, why would they not be equally essential for the security of every other country on the planet?

The truth is that nuclear weapons are not essential for the security of the United States. They are obsolete and outdated dinosaurs of the Cold War era, and the only way we are going to survive as a planet is if we stop pointing them at each other and work out a way to co-habit this small planet of ours.

The only solution is to engage in dialogue and to build relations based on mutual respect and a commitment to the principles of the United Nations.



MONEY SPENT ON NUCLEAR WEAPONS

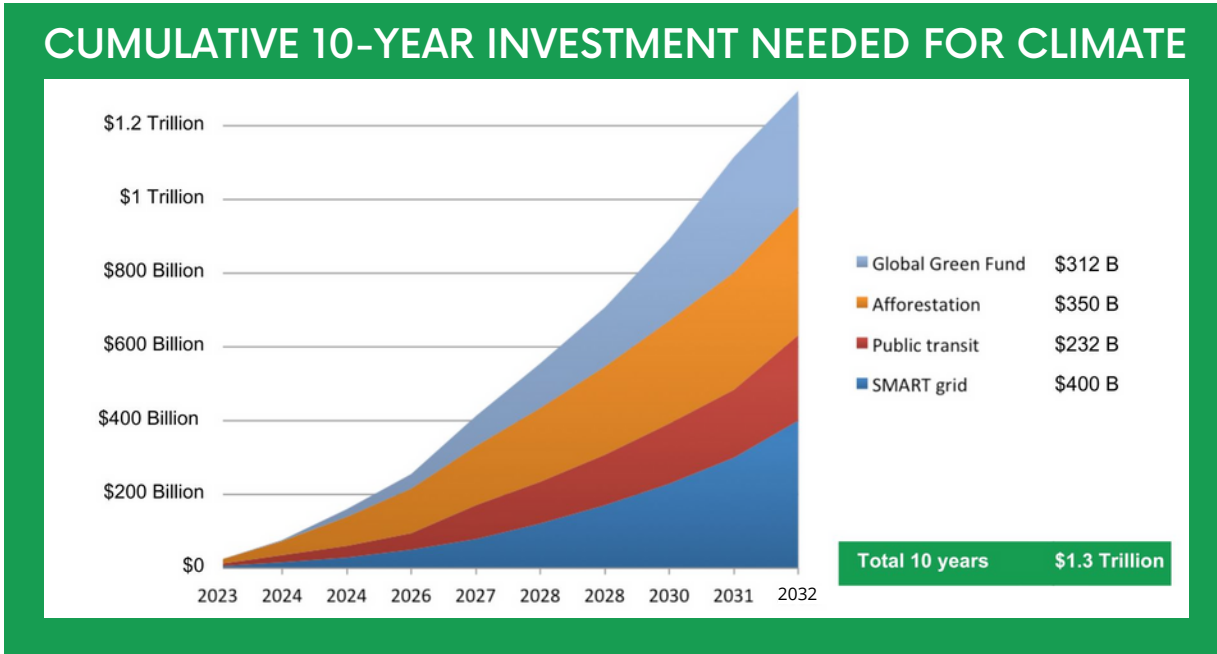


- The current 2023 budget for nuclear weapons is \$34.7 billion for the **Department of Defense** (for bomb delivery systems) plus 17.7 billion for the **Department of Energy** (for warheads). That brings the baseline cost for 2023 to \$52.4 billion.
- There is another \$24.7 billion in the DoD budget for **“missile defense”** to defend our nuclear missiles from our adversaries' missiles, bringing the total up to \$77.1 billion for 2023.
- Then there are the **“Legacy costs”** costs of **dismantling** nuclear weapons no longer in use, **disposing** of the radioactive waste and **cleaning up** the mess left behind from previous manufacture and testing of nuclear weapons, amounting to \$9.2 billion for 2023.
- Also, there are the **“Threat Reduction”** costs associated with **implementing arms control agreements** and programs to reduce the threat of nuclear weapons disappearing or falling into the hands of terrorists. That is another \$4.2 billion for 2023, bringing the total up to \$90.5 billion.
- Additional costs are **overhead** that the deployment of nuclear weapons incurs out of the total military budget, amounting to about \$5 billion on top of the direct costs. The total Pentagon budget has increased dramatically since then, so this is almost certainly an underestimate.
- As of 2020, the estimate for **final disposal** of high-level radioactive waste over the next 50 years was \$520 billion. Accounted for annually, that would add another \$10.4 billion per year to the \$95.5 billion figure we have so far.
- The Congressional Budget Office's projected long-term costs take into account **inflation, cost over-runs** and **changing priorities**. Spread over 10 years, they would add another \$9.6 billion per year.

The total accumulated expenditure on nuclear weapons over the next decade is now around **\$1.3 trillion**. Planned expenditures for the next 30 years would be well over **\$3 trillion**.



MONEY NEEDED TO ADDRESS CLIMATE CRISIS



What will it cost to save the planet from climate catastrophe, and where will the money come from? To reach net-zero by 2050 means spending money today on several fronts.

The Inflation Reduction Act includes a combination of tax credits, subsidies, and grants totaling at least \$369 billion (by far our largest climate investment yet) to shift our country decisively to clean electric power for transportation and manufacturing. But much more direct funding from the federal government is needed to be certain of meeting our targets for 2030 and 2050.

Some of the key public investments needed are listed here. Others include investments in high speed rail, battery storage, and subsidies for individual households investing in rooftop solar, wind, EVs and heat pumps.

- The US contribution to the global **Green Climate Fund** needs to be \$23 billion per year. President Biden recently announced \$1 billion per year.
- The US grid itself is out of date and very inefficient for moving electricity around the country. A new **national "smart grid"** is likely to cost between \$388-\$476 billion over 10 years, according to the Electric Power Research Institute.
- A massive investment in (electrified) **public transportation** for inner cities and poorer rural communities is essential and requires \$232 billion in investment.
- And a **major tree-planting initiative** could involve hiring one million people to plant billions of trees over the next decade, costing roughly \$30-\$40 billion per year, or \$300-\$400 billion for 10 years.

There are many more programs and costs associated with reaching net-zero emissions by 2050, but the most urgent needs for federal funding would cost an additional **\$130 billion per year, or \$1.3 trillion for 10 years.**



BRAIN DRAIN: STEM-TO-NUCLEAR PIPELINE

We already know how to generate electricity from the sun and wind. We know how to build a high-speed rail system. We know how to make buildings more energy efficient. **Many of the technologies needed to solve climate change have been invented, but not all.**

Science, Technology, Engineering, and Mathematics (STEM) experts are needed to rapidly advance the science of sustainability. Innovation is needed in order to improve efficiency and increase capacity of energy storage, energy transport, solar panels, wind turbines, hydropower, geothermal power, and the various forms of marine energy.

However, there is a serious shortage of STEM graduates in this country. One recent study suggests that by 2025, there will be over 2 million unfilled jobs in STEM fields.



As of 2016, China was granting almost eight times as many STEM degrees as the United States each year, in order to address their energy and industrial needs. India is graduating almost five times as many STEM majors. According to the Smithsonian Science Education Center, "STEM-related jobs in the U.S. grew at three times the rate of non-STEM jobs between 2000 and 2010. By 2018, it [was] projected that 2.4 million STEM jobs will go unfilled."

In the US, where do most of the current STEM graduates go? In 2017, 3 out of the 10 companies with the most STEM job openings were nuclear weapons companies: Lockheed Martin with 21,917, Northrop Grumman with 8,872, and Leidos with 8,468. In many areas of the country right now, the only jobs available to blue-collar workers as well as to newly qualified scientists and engineers are in the booming business of building nuclear submarines and ballistic missiles.

We need these people to help solve the problems of climate change. And we need many more of them to build and implement the new renewable energy systems that are necessary as we transition away from fossil fuels.



STEM RESEARCH AGENDA NEEDED FOR CLIMATE

Research and innovation can help drive down the costs of implementing a green transition. But they are also needed to solve many of the time-sensitive, technical problems which still beset the move away from fossil fuels.

BATTERIES

Electric cars are here, but more research is needed to improve **storage times, charging times and capacity to weight ratios**. More research is also needed to develop suitable electric alternatives for heavy duty trucks and other specialized vehicles, for better battery recycling systems, and for safer, environmentally sustainable, ethical sourcing of materials.

AVIATION

More research and development is needed in the area of **electric-driven and battery-powered air travel**. While hydrogen may turn out to be the fuel of choice for future air travel, improvements in battery efficiency, density, aerodynamics, and methods to fold or otherwise handle longer wingspans could be deciding factors.

SOLAR AND WIND

While the basics of solar and wind power are now well-established, more research is needed to **improve the capacity factors and efficiencies of both**, to connect them more effectively to utility-scale storage options, and to make them safer, more environmentally sustainable, and more ethical.

WAVE AND TIDAL POWER

Research on **harnessing the power of waves and tides** is still at a fairly early stage of development. Other possible sources of clean and renewable electricity also need further development, including turbines installed in **flowing water** that do not require dams or other environmentally damaging infrastructure.

HEAT FOR BUILDINGS

Further research is needed on **geothermal heat pumps** and the use of underground temperatures for both heating and cooling of buildings. Research is needed on other **energy efficiency** measures for existing buildings and on better ways to **convert existing gas-fired furnaces and boilers** to run on electric power. Another priority is adapting large buildings in dense city centers.

INDUSTRY

Research is needed to convert fossil fuel intensive industrial processes to electric alternatives, especially for the **production of steel and cement**. More research is also needed to **replace HFCs** with safe alternatives for cooling, refrigeration, and heat pumps.

AGRICULTURE

We already know much of what is necessary to reduce carbon emissions in agriculture: a return to farming and cattle rearing methods that do not rely so heavily on nitrogen fertilizers, storage of wet manure, overly intensive crop production, and cattle concentration. There are still some areas for further research and innovation in agriculture as well as in wetland and forest restoration.



CLIMATE JOBS

There are already 3.2 million people employed in the US renewable energy field. And according to the US Department of Labor, **wind turbine service technicians were the fastest growing occupation in 2022.**

Many of the new jobs that will be needed to implement a green transition are in **manufacturing, construction, operations and maintenance, forestry and other “green collar” jobs.** And many of these jobs will be direct replacements for existing fossil fuel-related jobs. For instance, huge numbers of workers in the car industry and allied fields will move from building and maintaining gas-powered cars to building and maintaining electric cars.

But to meet the climate targets in the timescale required, and to make it all affordable, workers are also needed in research, engineering, design, etc.

Many of these skills remain in short supply, and many of the people who will be needed to fill these roles are currently working for the nuclear weapons industry and in other military-related positions.

Job requirements for design and development positions in the nuclear weapons complex overlap extensively with the requirements for positions in green energy.

Both require advanced degrees and industrial experience in the fields of engineering, nuclear engineering, computer science, systems architecture, mathematics, physics or chemistry. The required skills overlap in information technology, computer science, modeling and simulation, risk analysis, and systems assessment.

A 2014 study in the UK looked at the workforce requirements, job descriptions, transferable skills and locations of 170,000 people currently employed in the UK making weapons and their delivery systems. It mapped these against the 300,000 or more jobs that would be needed to build and maintain enough offshore wind farms and marine energy projects to put the UK on the path to net-zero carbon emissions.

The results were astounding. The study found a direct correlation between many of the existing skills used to build nuclear submarines, for example, and those that would be needed to build wave and tidal energy projects. Even more surprising was the **direct correlation between locations of where these jobs would be based.** In that particular example, the study found that marine engineers and naval architects currently building a new generation of nuclear ballistic missile submarines for the UK at the Naval Shipyard in Burrow-on-Furness could switch over to designing and building the Morecambe Bay Tidal Barrage without even having to move to a different house.

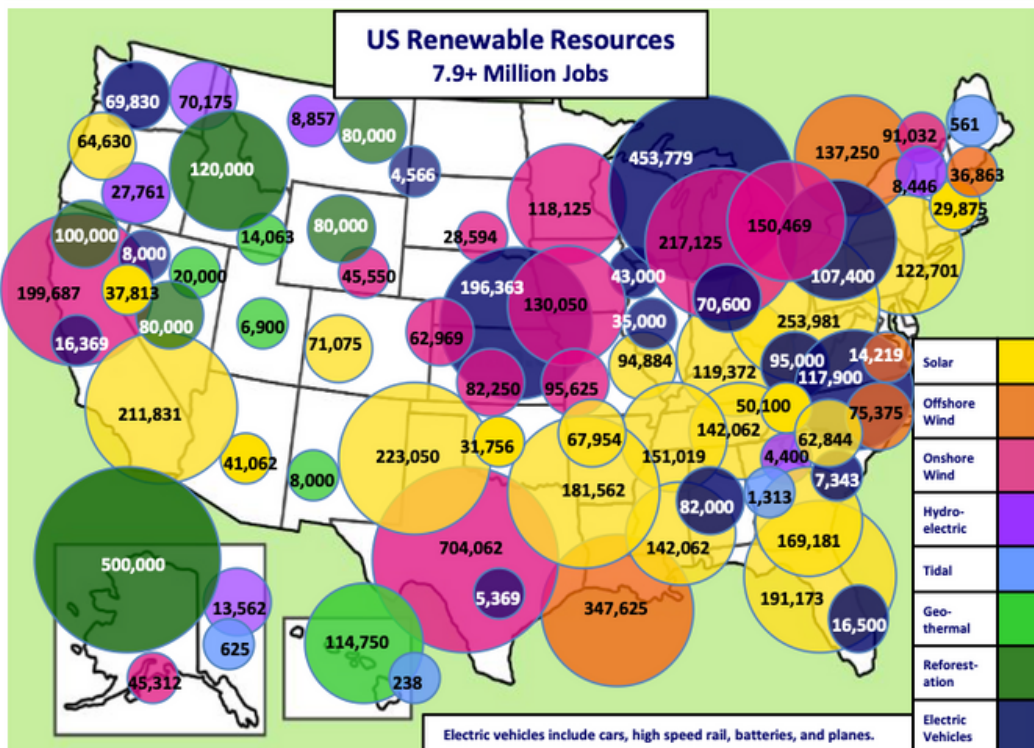
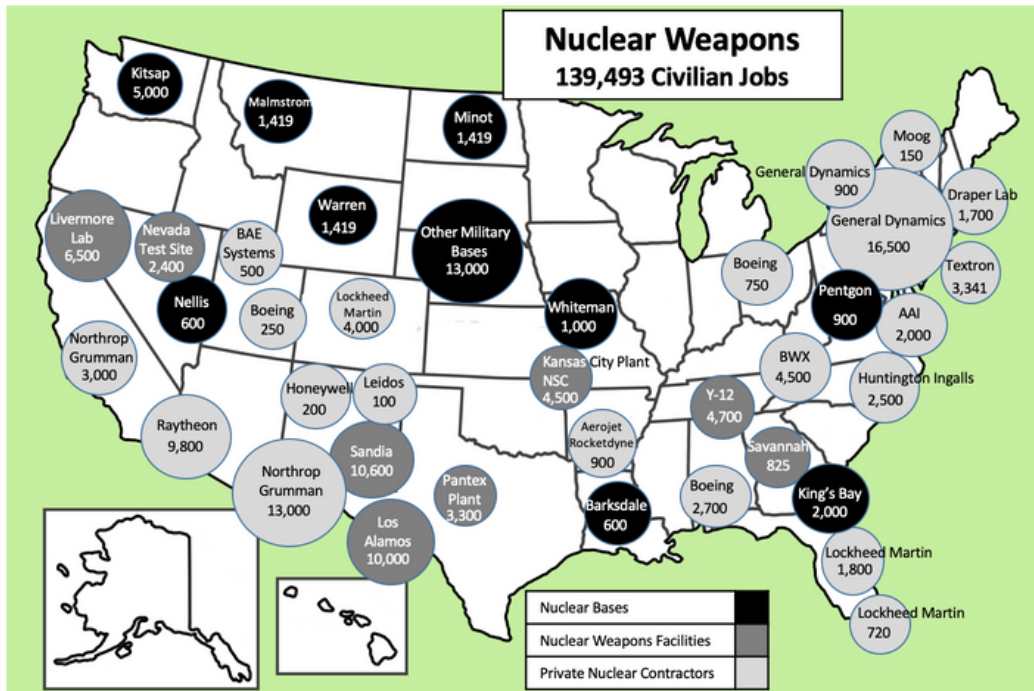
Similar studies in the US have looked at the massive potential for jobs in different parts of the country that could result from the tapping of offshore wind, hydropower and solar energy.

These have not as yet been mapped to the equivalent jobs or infrastructure currently absorbed by the military-industrial complex, but the pair of maps on the following page offers a preview of what more comprehensive mapping might reveal. There already seem to be patterns similar to those in the UK.



JOB CONVERSION

Preliminary US research suggests potential correlations between jobs in nuclear weapons and jobs in climate solutions - not just the skills, but even the locations.





WARHEADS TO WINDMILLS

Nuclear weapons pose an **EXISTENTIAL THREAT** to the entire planet.

To address this threat at the **SCALE** required and with the **URGENCY** it demands means making the global transition to a nuclear-free world.

This can only be achieved by **WORKING WITH THE REST OF THE WORLD** to abolish nuclear weapons.

The era of nuclear weapons is over. We need to use the **NUCLEAR BAN TREATY**.

To make the necessary transition requires a **BOLD AND COMPREHENSIVE PROGRAM** to achieve the complete elimination of nuclear weapons before it's too late.

This means going way **BEYOND THE INCREMENTAL STEPS AND FALSE SOLUTIONS** that have been tried for decades without achieving the necessary results.

This transition is not about taking jobs away from people - it's about transitioning to millions of **DECENT, WELL-PAID JOBS** helping to save the planet instead of helping to destroy it.

ELIMINATING NUCLEAR WEAPONS COULD RELEASE TRILLIONS OF DOLLARS AND OUR BEST SCIENTISTS AND ENGINEERS, AND KICKSTART A WHOLE NEW ERA OF INTERNATIONAL COOPERATION AND GOODWILL.

Saving the planet from nuclear war means **ELECTING LEADERS** who will take the necessary steps. It also means putting **PRESSURE ON THE CORPORATIONS** who profit from making nuclear weapons and have undue influence over our politicians.

Climate change poses an **EXISTENTIAL THREAT** to the entire planet.

To address this threat at the **SCALE** required and with the **URGENCY** it demands means making the global transition to a fossil free economy.

This can only be achieved by **WORKING WITH THE REST OF THE WORLD** to end the burning of fossil fuels.

The era of fossil fuels is over. We need to create a **FOSSIL FUEL TREATY**.

To make the necessary transition requires a **BOLD AND COMPREHENSIVE PROGRAM** to achieve the complete elimination of fossil fuels before it's too late.

This means going way **BEYOND THE INCREMENTAL STEPS AND FALSE SOLUTIONS** that have been tried for decades without achieving the necessary results.

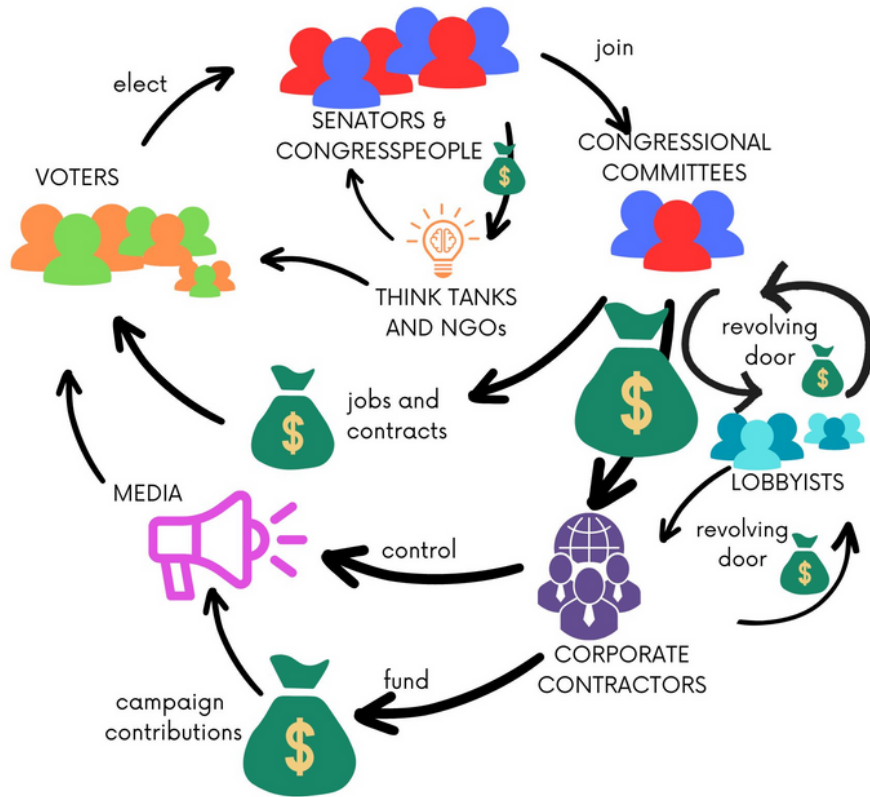
This transition is not about taking jobs away from people, it's about providing millions of **DECENT, WELL-PAID JOBS** helping to save the planet instead of helping to destroy it.

WHEREVER THE RESOURCES COME FROM, IT WILL TAKE TRILLIONS OF DOLLARS, OUR BEST SCIENTISTS AND ENGINEERS, AND A WHOLE NEW ERA OF INTERNATIONAL COOPERATION AND GOODWILL TO PREVENT CLIMATE CATASTROPHE.

Saving the planet from climate crisis means **ELECTING LEADERS** who will take the necessary steps. It also means putting **PRESSURE ON THE CORPORATIONS** who profit from burning fossil fuels and have undue influence over our politicians.



WHY IS THIS SO DIFFICULT?



Saving the planet should be a no-brainer. Why is it not happening at the scale or with the urgency required? One way to answer that question is to **follow the money.**



Who benefits from continuing to depend on fossil fuels and nuclear weapons? Who would have the incentive to do everything possible to prevent a transition away from these things - even when the survival of humanity is at stake?

The total number of people who directly benefit as directors, shareholders and employees of the major nuclear weapons and fossil fuel corporations comprise less than 0.1% of the total US workforce. In the fossil fuel industry there are many times that number whose livelihoods are directly or indirectly affected. And these are both trillion dollar industries.

For a very small amount of money and time invested in lobbying and supporting the re-election of politicians, advertising and influencing the media, think-tanks and other sources of information, these corporations reap enormous profits. In some cases this can amount to over 1,000% return on investment.

OpenSecrets.org tracks industry lobbying, revolving door appointments and campaign contributions to members of Congress. They identified 672 cases in 2022 in which the top 20 defense contractors had former government officials, military officers, members of Congress, and senior legislative staff working for them as lobbyists, board members, or senior executives. That year, Congress gave the Department of Defense over \$851 billion in total funding. Meanwhile, the oil and gas industry spent about \$124.4 million lobbying the federal government.

A 2014 Princeton study looked at 1,800 policy issues debated in Congress over a 20-year period, and whether or these were enacted into law or rejected. They found there was a near zero statistical correlation between what the majority of the public wanted or did not want as a policy and what was eventually adopted as policy by Congress. On the other hand, they found a near 100% correlation between what the economic elites (i.e. big business interests) wanted and didn't want and what ended up as US policy.



A STRATEGY FOR SURVIVAL

POLITICAL ADVOCACY

Ultimately, the prevention of climate catastrophe and nuclear war depends on a US President being willing and able to show true leadership and make the decisions needed to move this country and the world decisively away from fossil fuels and nuclear weapons. It takes elected Members of Congress being willing to take on the US corporations who profit from fossil fuels and nuclear weapons, and voting according to their consciences to save the planet. And it takes millions of ordinary citizens who will vote for planet-prioritizing politicians and who will continue to hold those politicians accountable for all their campaign promises.

PRESSURING THE PROFITEERS

But in this US, the views of voters carry less weight with politicians than the views of big corporations. We cannot get the political action we need unless we also put pressure on those corporations. Divestment and boycott campaigns, coupled with public shaming and shunning of the fossil fuel and nuclear weapons lobby can potentially hurt the bottom line of these corporations enough for them to want to move into other lines of business to stay solvent. These kinds of pressures have worked in the past, and they can work again.

BUILDING A MOVEMENT

In the US, young people are already leading the demand to take action on climate before it's too late. An older generation is leading on the need to eliminate nuclear weapons before it's too late. But there is still huge resistance to change, and not nearly enough is being done to address either of these existential threats. To make a real difference, we need to build a powerful movement that brings people together across the social and generational divides and unites us in a joint effort to save the planet.

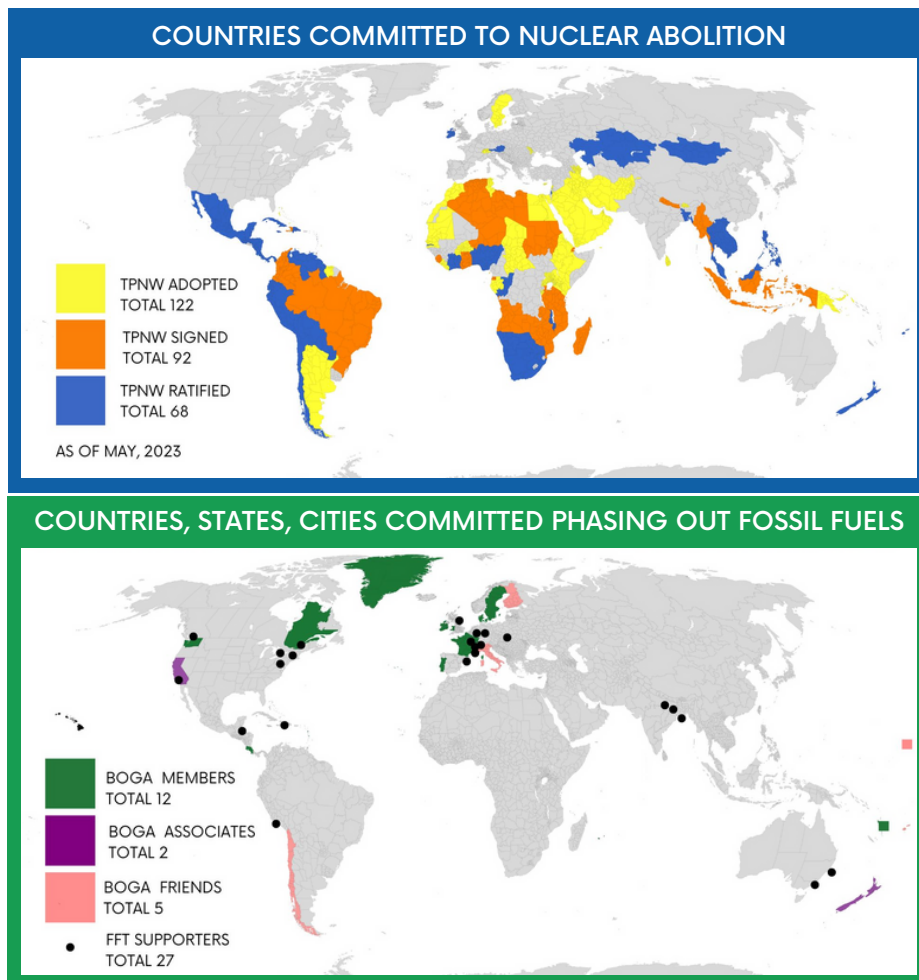


INTERNATIONAL ACTION

It's hard to imagine making progress of any kind in the United States right now. But it's not impossible. **We have allies all over the world who are working on these issues with us.** This is about building global solidarity with them.

Movements to address the climate crisis and to abolish nuclear weapons are especially strong in Europe, but also in many other parts of the world.

The Nobel Peace Prize-winning International Campaign for the Abolition of Nuclear Weapons (ICAN) now has 650 partner organizations in 110 countries, working to build support for the TPNW in their respective countries. And there are now more than 2,000 organizations worldwide supporting a Fossil Fuel Treaty to phase out all burning of fossil fuels.



And it's not just civil society organizations that are moving to address these twin existential threats. Governments are generally slow to respond to the real needs of the people they represent, but there is steady progress towards getting more and more governments on board with the elimination of nuclear weapons as well as the elimination of fossil fuels.



NATIONAL ACTION

THE PRESIDENT AND ADMINISTRATION

The powers of the US President are limited, but there are many things s/he can do without approval from Congress, and one of those is to sign international treaties.

In January 2023, 120 national, state and local organizations signed a letter to President Biden, urging him to **sign the Nuclear Ban Treaty** and begin negotiations with the other 8 nuclear nations for the complete, fair, safe, and verifiable elimination of all nuclear weapons.

The President should also join the global calls for a **Fossil Fuel Treaty** to phase out all burning of fossil fuels while ensuring a just transition for those affected.

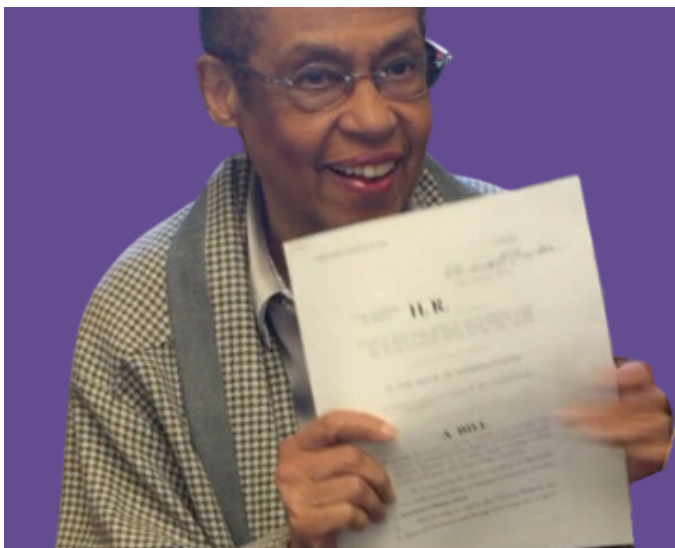
These treaties can form a solid basis for joint campaigning at the national level.

CONGRESS

There are a number of bills in Congress that would address the nuclear threat as well as building on previous climate legislation. None of these bills have any chance of getting passed by a divided Congress, but they are a useful focal point for challenging Members of Congress to do more.

The Green New Deal Resolution, H.Res.319/S.Res.173, introduced by Rep. Ocasio-Cortez and Sen. Markey, spells out what must be done to prevent climate catastrophe.

The Earth Bill, H.R. 598, introduced by Rep. Espailat, calls for the rapid transition to 100% percent renewable electricity, zero emission vehicles, and regenerative agriculture by 2030.



The Nuclear Weapons Abolition and (Climate) Conversion Bill, H.R.2775, introduced by Congresswoman Eleanor Holmes Norton, calls on the United States to sign the Nuclear Ban Treaty, ensure the total elimination of nuclear weapons, and convert all those wasted human and financial resources into the green technologies needed to address the climate crisis and other pressing human needs.

This is the “warheads to windmills” bill. It’s the main focus of a campaign to encourage Congress to address both of these existential threats at once.



STATE-LEVEL ACTION

In the meantime, there are many steps that individual states can take to begin moving this country in the right direction and to build the political pressure for bold and decisive action at the federal level. Most states have by now taken some kind of action on climate, and a few have passed resolutions to address the nuclear threat.

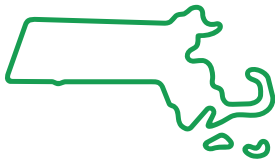


In 2018, **California** became the first state to pass sweeping climate legislation with Senate Bill 100. This paved the way for subsequent legislation and executive action by the Governor that is moving California towards a carbon-free future. The state has joined the international coalition to phase out fossil fuels, but has not yet committed to divesting state funds from the fossil fuel industry.

Also in 2018, the California state legislature passed Assembly Joint Resolution 33, calling on the US to “embrace” the Nuclear Ban Treaty and make nuclear disarmament the centerpiece of our national security policy. This was the first commitment to the TPNW by a state, and was followed by **New Jersey** General Assembly Resolution 230 in May 2019, which calls on the US to “ratify” the Nuclear Ban Treaty. Similar resolutions have since been passed by one or more chambers in Maine, Oregon and Rhode Island as a result of campaigning efforts by the Back from the Brink campaign.



Maine has also passed far-reaching climate legislation, and in 2021 committed its state pension fund to divest from fossil fuels. **New York** State announced plans to divest its \$225 billion Common Retirement Fund from fossil fuels prior to this, but without any legislation involved. So far these are the only two states that have taken steps to divest from fossil fuels.



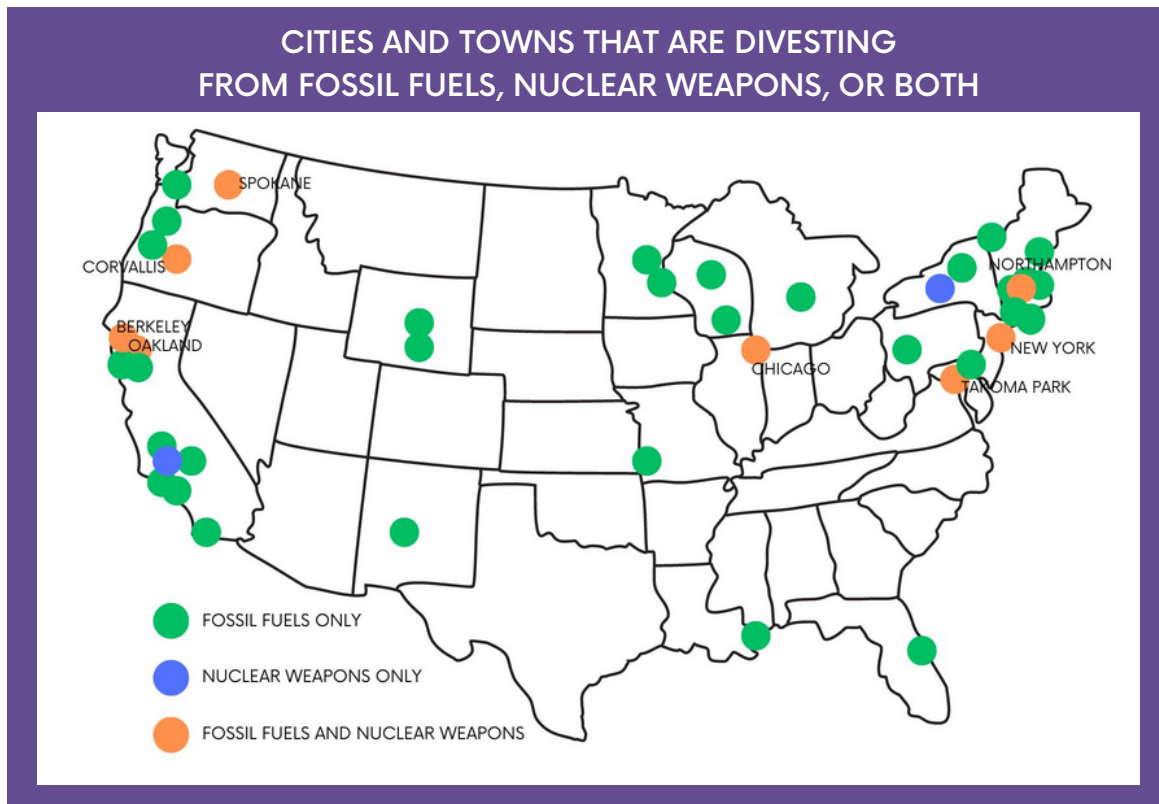
Massachusetts has passed pioneering climate legislation, setting up a roadmap in 2021 for reaching state decarbonization targets, and then in 2022 passing the Clean Energy and Climate Plan for 2050, which provides incentives for massive development of offshore wind energy, investments in public transit, regulations to end the sales of gas-powered cars and other measures to help the state move to a fossil-free future.

So far, despite a large number of nuclear weapons-related bills that have been introduced over recent years, Massachusetts has been unable to pass even a Back from the Brink resolution. In an effort to get things moving in Massachusetts, campaigners have proposed a **Nuclear Weapons and Climate Commission** to look into what the state could do to address these twin existential threats and to report back to the State House with recommendations for future legislation.

Other states have taken various steps on climate, but fall short of divestment or legally-binding measures to end reliance on fossil fuels. And very few have taken any steps at all on the nuclear weapons issue so far.



TOWN/CITY-LEVEL ACTION



It's at the municipal level where real action is being taken to put pressure on the corporations through divestment and other mechanisms, including refusal to enter into contracts with them, or even to allow them to conduct their business within a municipal jurisdiction.

At least 50 towns and cities in the US have so far committed themselves to divesting from fossil fuels, including some very large ones like New York, Los Angeles, Chicago, San Francisco, Denver, Boston, Seattle, Pittsburgh and others. These may well have an impact on the corporations.

Although it's impossible to know which is the chicken and which is the egg, this level of divestment parallels the growing commitment of politicians of both parties to take climate more seriously.

Nuclear weapons divestment is still comparatively small by comparison, but several cities have now committed to **divesting from both fossil fuels and nuclear weapons, which is the next big focus for campaigning at the municipal level.**

In addition to divestment, some cities have passed "disqualification of bidders" legislation to prevent nuclear weapons companies from entering into contracts with the city.

Northampton, Massachusetts had to get permission from the state to bypass state laws requiring contracts to go to the lowest bidder. The Northampton "home rule petition" was successfully passed by the state legislature and signed into law by the governor, setting a precedent for the 350 other towns and cities in Massachusetts to be able to follow their example.



AGENDA FOR ACTION

What if we really are facing not one but two global, life-threatening emergencies of existential proportions? If that were the case, how would you be spending the coming days, weeks, months, years? Would you carry on as normal? Would you look for something that seems at least vaguely possible in the current political climate? **Or would you give everything you've got to the struggle for survival - not just your own survival, but our survival - as a civilization, as a species, as a planet?**

At the international level, you can add your voice and lend your support to the global efforts to get more countries on board with the **Nuclear Ban Treaty** and a **Fossil Fuel Treaty**, and put real pressure on the companies and the countries that are endangering us all.

At the national level, you can **urge President Biden to sign the Nuclear Ban Treaty and signal his support for a Fossil Fuel Treaty**. You can write to your Senators, urging them to support the strongest possible action to address these two existential threats. You can write to your US Representative urging them to support the **Norton Bill H.R. 2775** to abolish nuclear weapons and use all that money, brainpower and other resources for climate solutions.

At the state level, you can support efforts to **divest state funds from both fossil fuels and nuclear weapons**, or to set up a citizens' commission to look into what your state can do and make recommendations.

You can **support similar efforts in your city or town**, passing resolutions, sure, but also going beyond that to divest, refuse contracts with these companies, and publicly shame them where you live - until they change their tune and agree to support the elimination of fossil fuels and nuclear weapons.

And you can support such efforts at your workplace, where you shop, at any clubs or groups you belong to, your bank, your faith community. You can encourage labor unions, civic organizations, hospitals, schools, colleges and local businesses to **take these twin threats seriously**.

Finally, there is so much more we each can be doing individually to ensure our collective survival. **If you have money in a bank, in stocks, or in a pension fund, you can demand that those institutions divest from both fossil fuels and nuclear weapons**. And if they do not, you have the power to move your money.

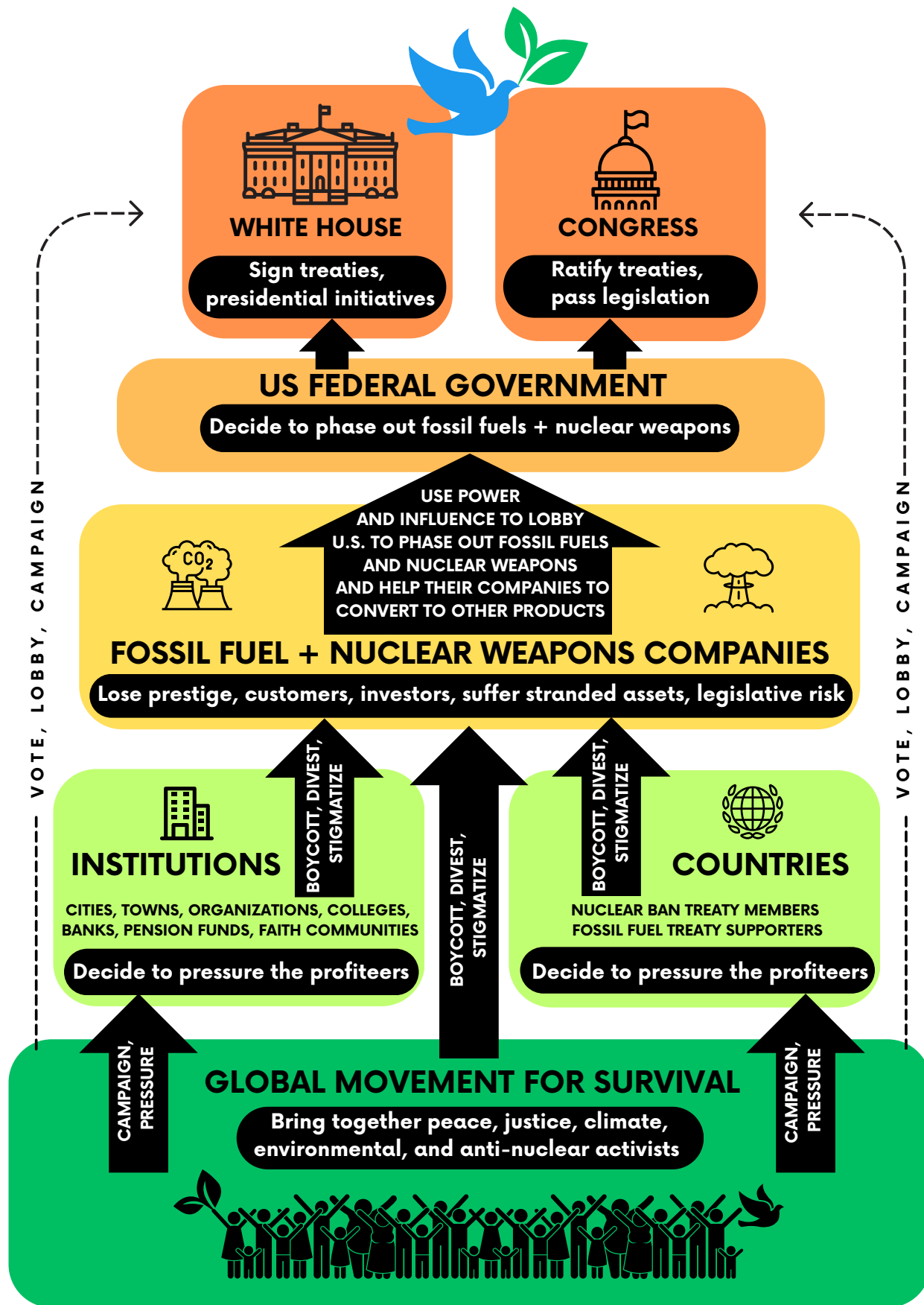
If you own or rent property, you may be able to choose the supplier of your electricity. You may be able to install solar panels on your roof. You may be able to choose which companies you purchase or rent equipment from. Some companies that make nuclear weapons also make all kinds of household goods. **You have power as a consumer**.

Ultimately, our power is in our numbers and in working together to fight for our survival.

JOIN US! for more information about getting involved in the national Warheads to Windmills campaign, go to: www.warheadstowindmills.org



A STRATEGY FOR THE US



WARHEADSTOWINDMILLS.ORG

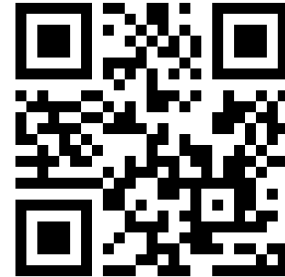
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TAKE ACTION

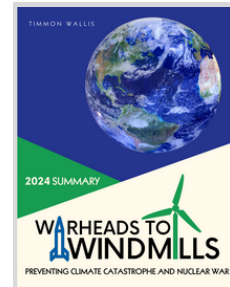
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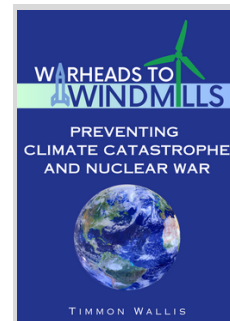
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JOIN THE WARHEADS TO WINDMILLS COALITION (organizations)
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Our civilization is being sacrificed for the opportunity of a very small number of people to continue making enormous amounts of money.

We cannot solve a crisis without treating it as a crisis.
Until you start focusing on what needs to be done,
rather than what is politically possible, there is no hope.

Greta Thunberg

Can we address the climate emergency adequately without ending the nuclear emergency?

Which climate solutions can really work, and which are just more corporate profiteering?

Do nuclear weapons keep us "safe?"



To address the climate crisis, **WE URGENTLY NEED** international goodwill and the resources that are currently **WASTED** on nuclear weapons.