



Unmasking the Future of Energy: Nuclear Power in a Biased World

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Due to recent airline incidents, you are a little hesitant to book a flight. Outrageous fees, plane doors falling off mid-flight, and crashes are things you want no part in. You consider driving to your vacation destination. “It’s safer, and it’s cheaper,” you tell yourself.

Is it?

Since 2017, there have been ~1,725 airline fatalities, 0.00002% of the global population. Since 2017, there have been ~9,450,000 motor vehicle fatalities, 0.12% of the global population.

A flight from San Francisco to Miami, including expenses for one checked bag, an in-flight meal, and a week's car rental, totals ~\$315. Driving could cost about \$1,300 due to gas, hotels, and meals. Moreover, flying reduces the travel time to just one day, making it a more efficient and economical option.

When looking at the data, the facts, it is clear that flying is safer and more cost effective than driving. Bias plays a major role in our decisions. It affects choices on how to travel and what to eat, and bigger, more important decisions like who to vote for and how to satisfy the world's energy needs. Many suggest that solar and wind are not just alternatives, but the best choices we have for a sustainable future.

Bias is blinding us to the truth. The future of energy is nuclear.

All signs point to nuclear energy

Energy is civilization's life support. Without it modern society collapses. As we grapple with the challenge of increasing energy demand, nuclear power



presents a compelling solution that is both cleaner and safer than traditional and renewable energy sources.

Safest High Output Energy Alternative

Nuclear energy is associated with safety risks; however, when compared to other high-output energy sources, it emerges as the safest. It results in 99.9% fewer deaths than brown coal, 99.8% fewer than coal, 99.7% fewer than oil, and 97.6% fewer than natural gas. The death rates per unit of electricity production for nuclear power is also significantly lower. Nuclear energy has the lowest deaths per terawatt-hour of energy production at 0.03 compared to brown coal at 32.72 and oil at 18.43. This stark difference illustrates nuclear energy's superior safety profile in operation.

Nuclear power is the leading source of clean energy in the United States, generating close to 775 billion kilowatt-hours of electricity annually. It accounts for nearly half of the nation's emissions-free electricity, preventing more than 471 million metric tons of carbon dioxide from entering the atmosphere each year—equivalent to taking 100 million cars off the road.

However, if nuclear energy is so safe and effective, why are there so few power plants?

Bias.

Bias distorts your perception of reality, leading to wrong decisions and conclusions. Understanding and recognizing bias enables individuals and organizations to identify it, and guard against it, to make more informed decisions. This awareness also enhances communication, trust, and credibility, as it shows a commitment to objectivity and transparency.

Confirmation Bias is a bias of belief in which people tend to seek out, interpret, and recall information in a way that confirms their preconceived notions and ideas.

It plays a significant role in shaping people's opinions and perceptions about



nuclear energy. Individuals with a pre-existing belief that nuclear energy is dangerous tend to focus on information that confirms this view, highlighting incidents such as the disasters at Chernobyl and Fukushima. People fall prey to confirmation bias and interpret these events as definitive proof that nuclear energy in general is inherently unsafe. Bias leads us to overlook or dismiss data that shows improvements in safety protocols, technological advancements, and the successful operation of numerous nuclear power plants worldwide, because these facts do not confirm our preconceived opinions.

In public discourse, confirmation bias has polarized debates; neither side is willing to acknowledge valid, opposing points. Proponents of nuclear energy dismiss concerns about safety and waste management as irrational fears. Opponents ignore the potential benefits of nuclear power to reduce greenhouse gas emissions and provide a stable energy supply.

Similar to confirmation bias, there is a mental shortcut called the **Availability Heuristic** that relies on examples that come immediately to mind when evaluating a topic, concept, method, or decision. It can lead to overestimating the likelihood or importance of events based on their recent occurrence or vividness in memory. When nuclear energy is brought up many of us subconsciously, and often consciously, think of death, disaster, and destruction. Why?

Media, Culture, and History

Media coverage of nuclear energy is mostly limited to disasters. It tends to highlight the immediate negative consequences, then draw conclusions about what they mean for the long-term viability of nuclear energy. Coverage highlights the most frightening aspects of nuclear energy failures, such as radiation sickness, environmental contamination, and the potential for widespread death. The intense coverage skews public perception and makes nuclear energy appear inherently dangerous, even though these incidents are rare and due to specific circumstances.

Popular culture, including films, books, and television, depict nuclear energy



in a negative light, focusing on the potential for meltdowns, mutations, and other catastrophic outcomes. These portrayals shape public perceptions, and reinforce the idea that nuclear energy is dangerous.

During the Cold War, nuclear technology was synonymous with nuclear weapons, which symbolize annihilation and global threat. This association between nuclear power and the potential for widespread destruction has persisted, and due in part to bias, it influences public attitudes toward all forms of nuclear technology, including energy production.

Major nuclear incidents like the Chernobyl disaster in 1986 and the Fukushima accident in 2011 have left a lasting impact on public consciousness. Although these events were tragic, they prompted a global reassessment of nuclear safety standards and the implementation of more stringent regulations. Today, modern nuclear power plants incorporate multiple redundant safety systems and are designed to withstand extreme natural disasters.

Nuclear is expensive but benefits justify the upfront costs

One of the most significant barriers to the initial adoption of nuclear power is its high upfront costs. Many push for “cheaper” options such as solar and wind without an understanding of the big picture. Constructing a nuclear power plant is capital-intensive, and requires substantial investments in safety, regulation, and technology.

According to the World Nuclear Association, the capital costs can vary significantly depending on the country and specific project but generally range from \$6 billion to \$9 billion for each new reactor. However, these initial costs are mitigated over the long term by the low operational and maintenance costs and the high energy output of nuclear reactors.

Anchoring Bias: *The tendency to rely too heavily on the first piece of information encountered (the "anchor") when making decisions, even if subsequent information is more relevant or reliable.*



Anchoring bias plays a significant role in discussions about renewable energy. A common anchor in these debates is the assertion that "solar and wind are cheap." While this statement is accurate in the context of initial construction costs, it oversimplifies the broader economic picture. Low upfront costs often overshadow the long-term considerations, including maintenance costs, long-term efficiency, and dismantling the solar panels or wind turbines at the end of their useful life.

These costs can be substantial, yet they often get less attention because people anchor their beliefs to the initial cost narrative. By recognizing and understanding anchoring bias, we can approach renewable energy discussions with a more balanced perspective, considering their economic and environmental impacts over their full lifecycle.

There are numerous benefits of nuclear energy

Beyond safety and cost, nuclear energy has attributes that make it an excellent source of energy.

Availability

Unlike wind and solar, which can vary in output depending on weather conditions and time of day, nuclear power plants produce a steady output of electricity. They operate independently of seasonal or daily weather variations, providing a consistent power supply. Predictability allows grid operators to plan with certainty, and ensure the supply meets demand at all times. Nuclear helps maintain the balance between supply and demand, reducing the risk of voltage fluctuations and power outages. This stability is especially important as the proportion of intermittent renewables in the energy mix increases.

Capacity

The capacity factor of a power plant is a measure of how it runs at full capacity over a specific period. Nuclear power plants have one of the highest capacity factors of any energy source. According to the U.S. Energy Information



Administration (EIA), nuclear power plants in the United States had an average capacity factor of about 93% in 2020. This compares favorably to renewable sources - in the same year, the capacity factors were about 35% for wind and 25% for solar systems in the U.S. This high capacity factor underscores nuclear energy's role in providing consistent and reliable power. [Office of Nuclear Energy](#)

Energy Density

The energy density of nuclear fuel is significantly higher than that of fossil fuels. One pellet of nuclear fuel, the size of a fingertip, produces the same amount of energy as nearly one ton of coal or 149 gallons of oil.

It also has a higher energy density than wind and solar. Nuclear plants can produce a large amount of energy in a relatively small area - a typical nuclear reactor can produce 1 gigawatt (GW) of electricity, which would require nearly two coal plants or three to four wind or solar plants of the same size to produce.

Land Usage

The land use for nuclear energy is significantly less than for wind and solar. Nuclear plants require far less space compared to wind farms and solar arrays. For example, generating the same amount of electricity from wind would require 360 times more land, and from solar would require 75 times more land than nuclear. This makes nuclear energy a more feasible option in terms of spatial efficiency, especially in regions where land availability is a constraint.

Low Emissions

Nuclear power is one of the cleanest energy sources. Both nuclear and renewables like wind and solar emit very low levels of CO₂ during operation. However, nuclear energy can operate continuously and does not depend on weather conditions, providing a stable supply of low-carbon electricity. This stability is critical for maintaining a reliable power grid and reducing reliance on fossil fuels.



The Facts Support Nuclear Energy

Nuclear energy, with its unmatched capacity for high-output, reliable, and low-carbon energy, is indispensable in the transition to a sustainable energy future. Despite high initial costs, the long-term economic benefits and ongoing technological advancements make it a viable and essential energy source. As global energy demands continue to rise, we must recognize our biases, focus on the facts, and embrace nuclear energy as a critical element of our plan to ensure energy security and meet sustainability goals.

About us: mXa, on the 20+ year foundation of Method360, was founded to intentionally serve fast-growth companies and the unique challenges they face. We understand that inorganic and organic growth provokes change, ambiguity, and uncertainty that can deeply burden the organizations involved. By seeking to understand the human element in M&A and fast growth environments, mXa embraces a unique, contrarian approach in advising clients that seeks to realize maximum value for them in alignment with business objectives.

Interested in learning more about our capabilities or discussing your M&A or AI story? We're here to help.

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