Environmental Grantmakers Association Fall Retreat panel
“Nuclear Power—Deterring the Myths: Disinformation, Deregulation, and Data Centers,” Virginia Beach, Virginia, 28 September 2026

Amory B. Lovins

盧安武 博士　एमोरी लविन्स　エイモリー B. ロビンス　Ловинс Эймори Блох

Adjunct Professor 2020–24, Lecturer 2025– in teaching terms, currently Adjunct Lecturer, Department of Civil & Environmental Engineering, and Senior Precourt Scholar of Integrative Design and Energy Efficiency, Precourt Institute for Energy, Stanford University; Cofounder (1982) and Chairman Emeritus, RMI (www.rmi.org)

ablovins@stanford.edu, efficiencyhub.stanford.edu

[target 11m; rehearsal 11:05; actual **TK**]
[ignore any bracketed small type, which won’t be spoken]

Good day. Nuclear power has five big problems *besides* its public risks. *

The nuclear power distraction

Environmental Grantmakers Association Fall Retreat panel
"Nuclear Power—Deterring the Myths: Disinformation, Deregulation, and Data Centers," Virginia Beach, Virginia, 28 September 2026

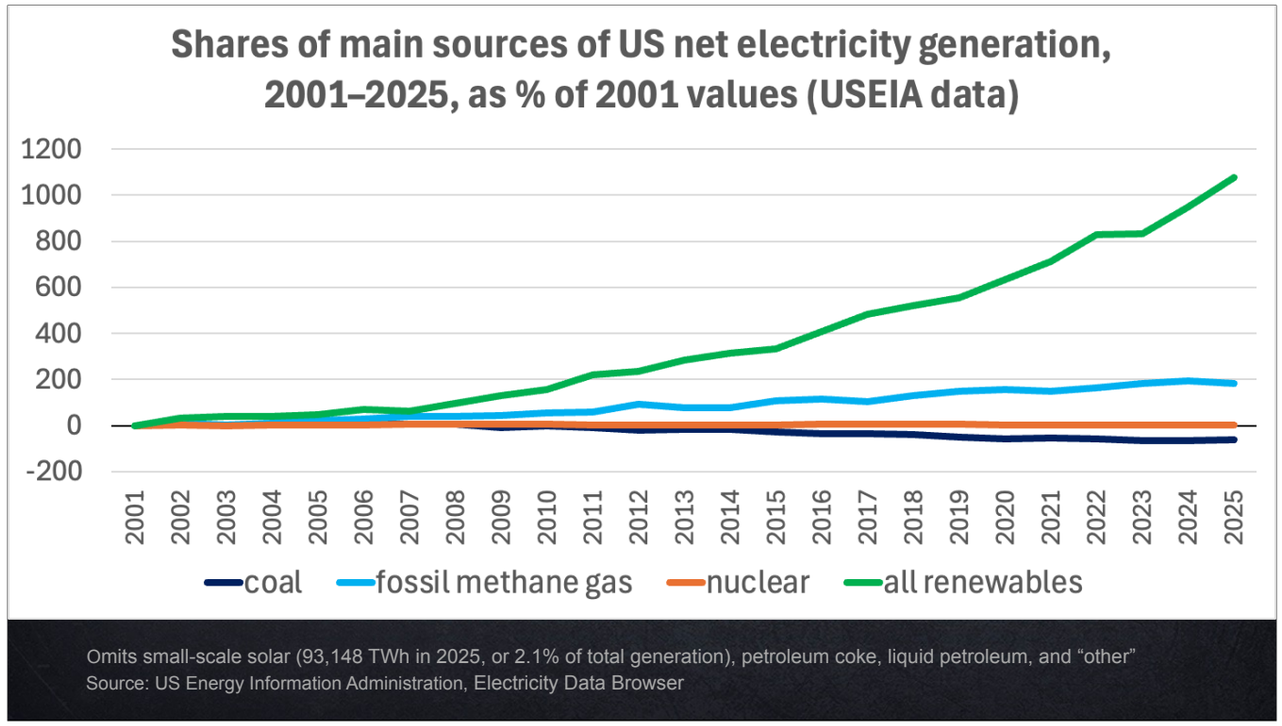
Amory B. Lovins

盧安武 博士　एमोरी लविन्स　エイモリー B. ロビンス　Ловинс Эймори Блох

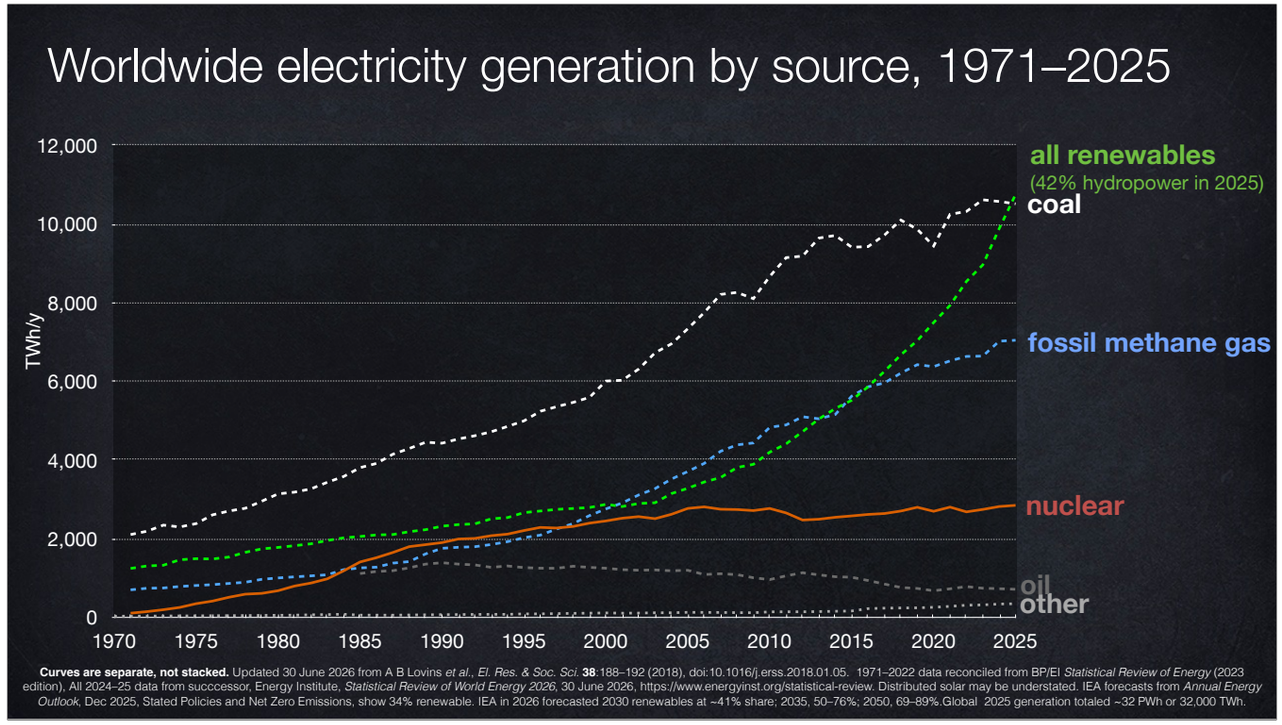
Adjunct Professor 2020–24, Lecturer 2025– in teaching terms, currently Adjunct Lecturer, Department of Civil & Environmental Engineering, and Senior Precourt Scholar of Integrative Design and Energy Efficiency, Precourt Institute for Energy, Stanford University; Cofounder (1982) and Chairman Emeritus, RMI (www.rmi.org)

ablovins@stanford.edu, efficiencyhub.stanford.edu

First, it has no business case, so it's shunned by private capital markets. Once historically significant, nuclear power stagnated decades ago. It's slowly dying of an incurable attack of market forces. *



Nuclear power's <9% share of world and <18% of US electricity (orange) keep shrinking, because it's uncompetitive to buy and unprofitable to sell. It has become just *a minor distraction with a giant megaphone*, flooding you with skillful disinformation so you won't realize that renewables (green) have already won. *

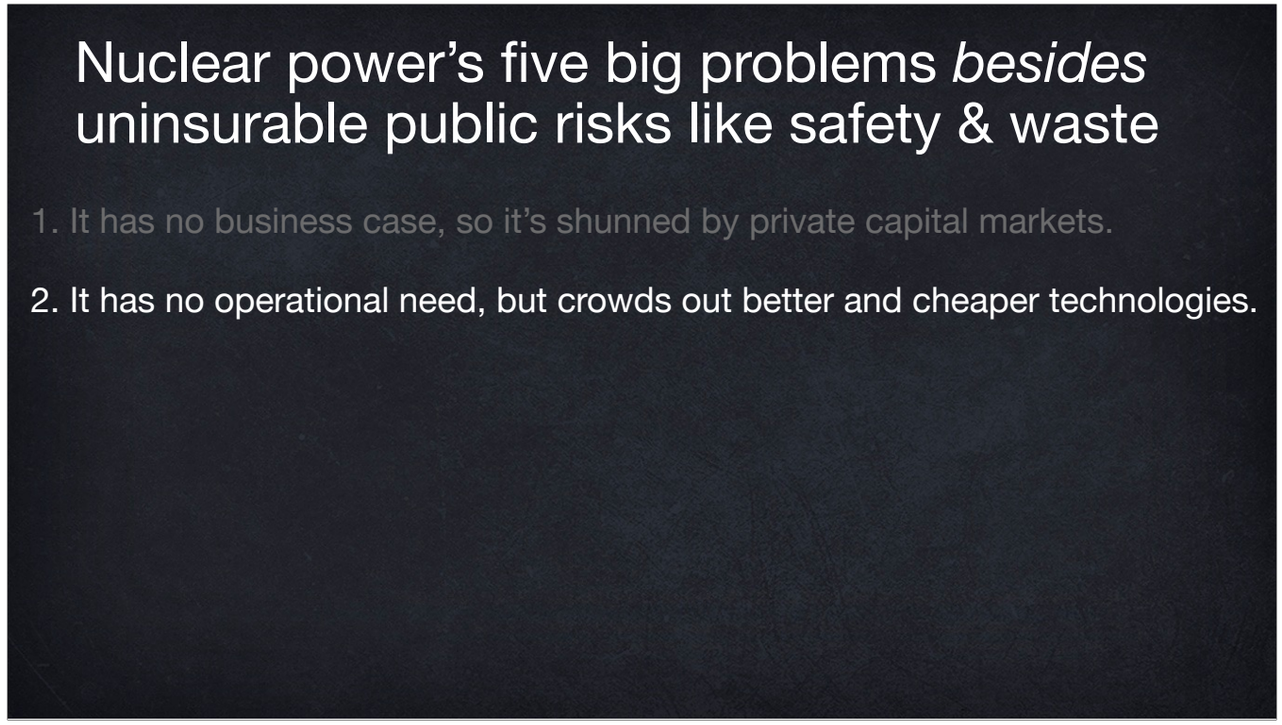


Worldwide, by last year, nuclear power was producing just one-fourth as much electricity (orange) as renewables (green). *Renewables added more net capacity every 21 hours than nuclear power added all year.* That's *137 times more* than nuclear added [686 *vs.* 5 GW, per IEA]. This year, solar power alone will outgenerate nuclear. Next year, battery capacity may surpass it. /

Nuclear's downfall was basic market economics. Solar and windpower generally cost less to *build and* run than reactors cost just to run—even after adding battery storage for equally steady renewable output. That's why *over 90% of new global and US generating capacity is renewable,* mostly bought by voluntary investors. *Only a few percent* is nuclear, forced on taxpayers by governments. /

Of the 250-odd US power reactors once proposed, almost half were cancelled, but 96 still operate, averaging 44 years old—beyond their design life. Most couldn't cover their operating costs, but were bailed out by 12-figure subsidies. Those alone could have bought even more renewables. /

The 2005 "nuclear renaissance" announced more than 30 new reactors but built just two—the Plant Vogtle reactors in Georgia that Kim discussed. Today, gutted regulation, and new subsidies approaching $200 billion, are producing many press releases *but few actual projects*. The industry's business model has quietly shifted from selling products to grifting subsidies. Its global track record inspires scant confidence. Capital markets are deeply skeptical. Three nuclear startups alone just lost $30b in value. Ultimately, markets do beat politics—unless overwhelmed by even more extravagant subsidies, blockades on cheap clean technologies, and corruption. *



Second, nuclear power has no operational need.

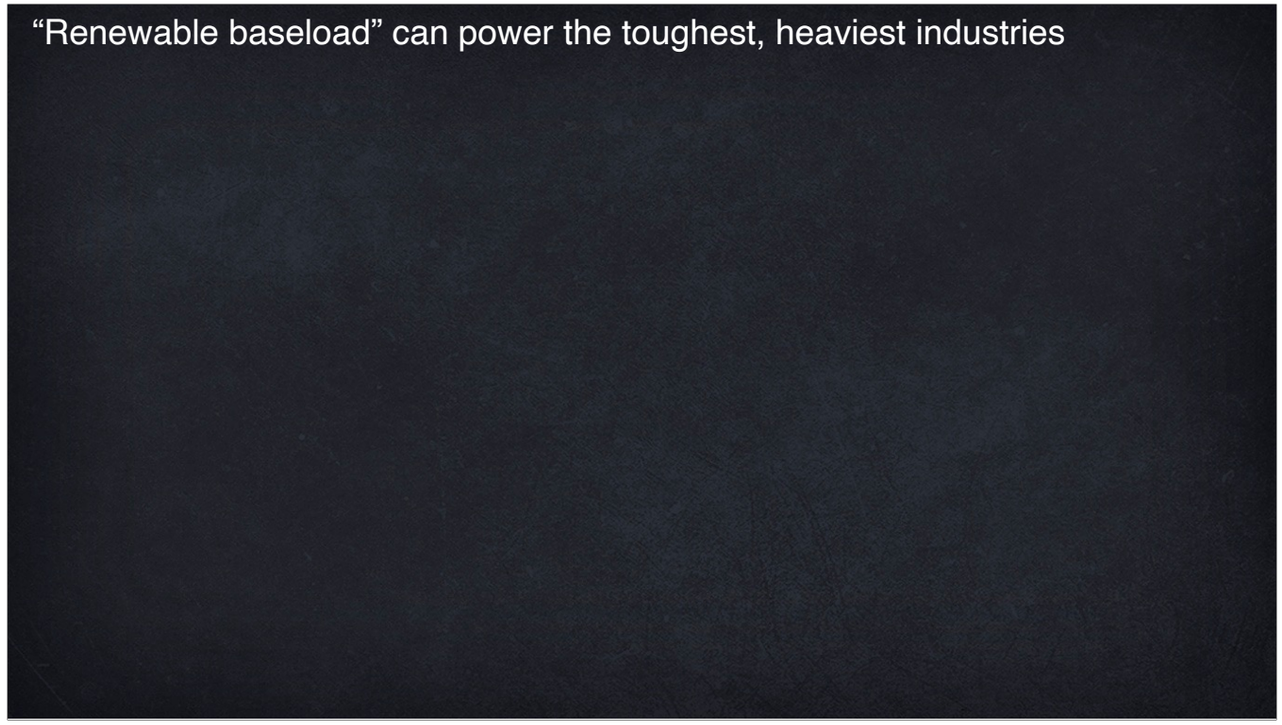
In modern grids, it brings no special operating, reliability, or resilience benefits. It's too lumpy and inflexible for efficient, agile, diverse, distributed, weather-tolerant, and resilient power systems. All generators sometimes fail, but nuclear failures are generally bigger, longer, more abrupt, and far less predictable than solar and wind failures, requiring more and costlier backup. US nuclear power also needs more backup because it matches varying day-and-night loads less well than solar plus wind do. And nuclear power in Japan, France, and Sweden has proven quite unreliable, even causing emergencies in Hungary and Romania. /

Also, by hogging grid and market space, nuclear power crowds out cheaper competitors; yet it's often shielded from competition by loan guarantees and fixed high prices. Some countries run it whenever possible because it's not good at following varying loads, so cheaper renewables get turned off. /

Nuclear power *won't be needed to finish decarbonizing*. Solar and windpower reliably run industrial economies like Germany, now nuclear-free and 62% renewable [first half 2026], or 88%-renewable Denmark. South Australia's 3[.3]-GW grid is three-fourths powered by solar and wind, expecting 100% next year, so 37 big firms want to move there. Now cheap batteries deliver cheap solar and windpower whenever we want, so nuclear power simply isn't needed, for data centers or anything else. *

This 100%-solar microgrid near Reno, Nevada, powers data centers more cheaply and reliably than grid power could

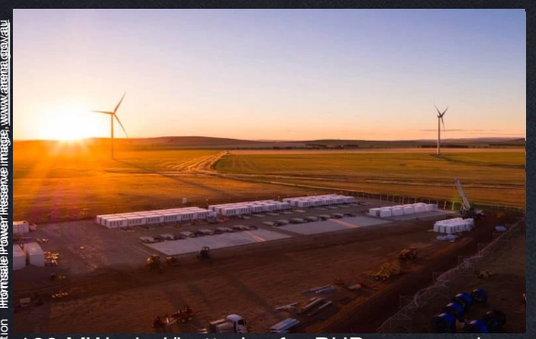
Thus this 100%-solar microgrid powers data centers more cheaply and reliably than the traditional centralized utility grid or nuclear power. Solar panels laid on the ground (at the rear) deliver 12 million watts [MW_{AC}] at below the [$80/MWh] grid price. In front, 800 used electric-car battery packs, wrapped in white tarps and set on cinderblocks, safely ensure round-the-clock operation [operational availability since turn-on in June 2025 is 99.2%]. After a few years, the old batteries are swapped out and recycled. Where land costs more, the batteries can be safely and cheaply stacked in a smaller footprint. This plant was built in *four months.* It's now being expanded sevenfold to add another 20 modular data centers. Google just contracted for a solar microgrid >200× this size [2.5–2.9 GW_{DC}] in Arkansas, being built [with new batteries] in under three years. More fossil fuels burn while waiting *ten* years for nuclear plants—which, with their fuel cycle, also occupy three times *more* land per kWh. *



Renewables can do our hardest tasks. * Australia is racing to power giant mines and * smelters with battery-backed “renewable baseload” contracts, sped by robotic panel installation and self-lifting wind turbines that go up in a day. In Pueblo, Colorado, county and state leaders fearing lost tax revenue from a retiring coal plant are warming to a proposed, exorbitant, but imaginary small-modular-reactor replacement, * yet this Pueblo steel mill is over 90% solar-powered and supports more than a thousand jobs. Apple has run four US data centers all on renewables since 2014, and the whole company since 2018. The Pentagon has long chosen renewables to protect critical missions from vulnerable fuel logistics. *

[EVRAZ solar steel mill: https://www.bp.com/press-and-publications/press-releases/lightsource-bp-launches-bighorn-solar-project-in-colorado-powering-world-first-steel-mill-to-run-almost-entirely-on-solar, https://bigpivots.com/no-4-a-solar-powered-steel-mill/]

“Renewable baseload” can power the toughest, heaviest industries



Hornsdale Power Reserve image, www.arena.gov.au

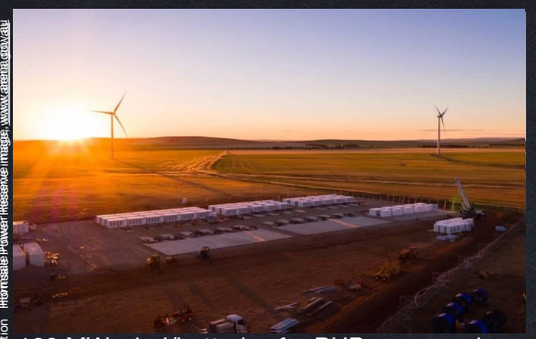
100 MW wind/batteries for BHP copper mines

Turner River solar farm, https://www.fortescue.com/en/articles/fortescue-accelerates-real-zero-with-construction

690 MW solar + 650 MWh batteries for Fortescue iron mining; 1.4 GW of Pilbara renewables by 2028

https://bigpivots.com/no-4-a-solar-powered-steel-mill/

“Renewable baseload” can power the toughest, heaviest industries



Hornsdale Power Reserve image, www.arena.gov.au

100 MW wind/batteries for BHP copper mines

Boyne aluminum smelter. 8 TWh/y, https://discoveryalert.com.au/australias-industrial-energy-evolution-2026/

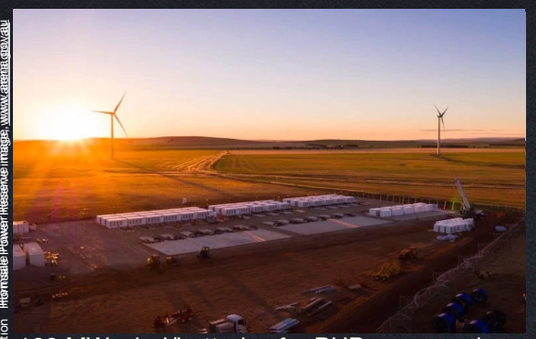
2.8 GW solar/wind/batteries for Rio Tinto aluminum smelter

Turner River solar farm. https://www.fortescue.com/en/articles/fortescue-accelerates-real-zero-with-construction

690 MW solar + 650 MWh batteries for Fortescue iron mining; 1.4 GW of Pilbara renewables by 2028

https://bigpivots.com/no-4-a-solar-powered-steel-mill/

“Renewable baseload” can power the toughest, heaviest industries



Hornsdale Power Reserve image, www.arena.gov.au

100 MW wind/batteries for BHP copper mines

Boyne aluminum smelter. 8 TWh/y, https://discovery.alert.com.au/australias-industrial-energy-evolution-2026/

2.8 GW solar/wind/batteries for Rio Tinto aluminum smelter

300 MW for >90%-solar Pueblo, CO steel mill

Turner River solar farm. https://www.fortescue.com/en/articles/fortescue-accelerates-real-zero-with-construction

690 MW solar + 650 MWh batteries for Fortescue iron mining; 1.4 GW of Pilbara renewables by 2028

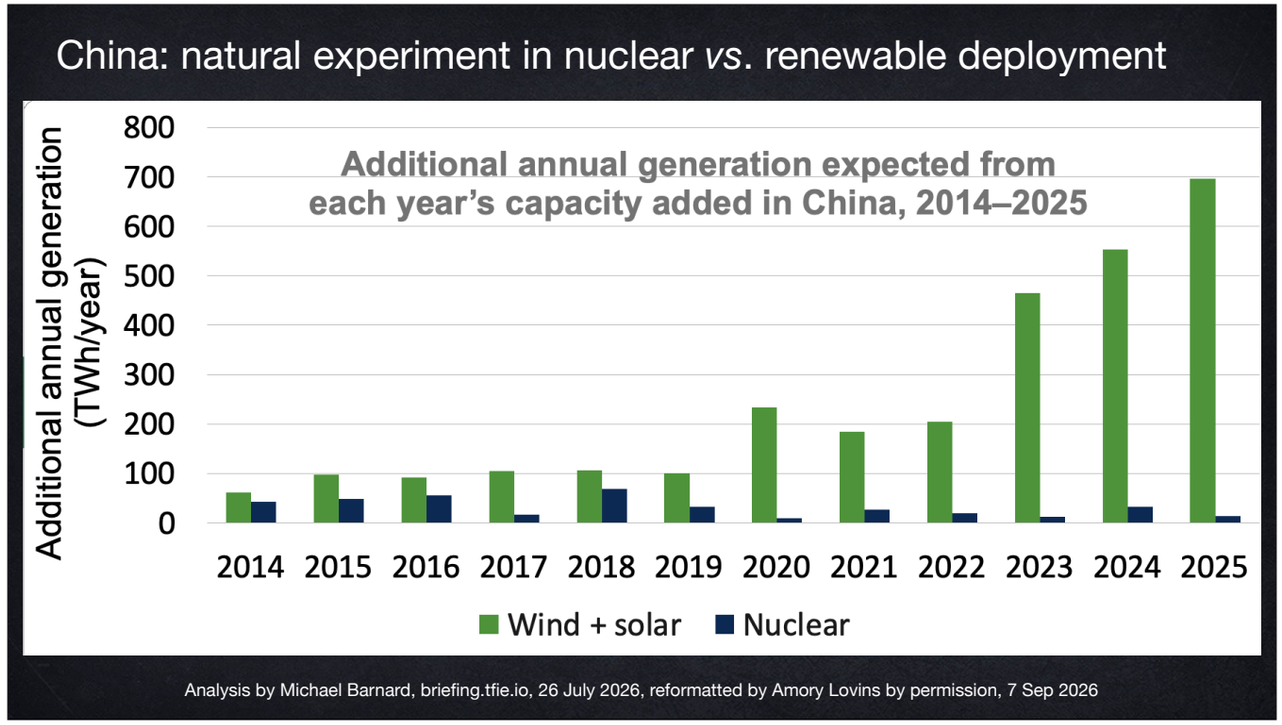
https://bigpivots.com/no-4-a-solar-powered-steel-mill/

Third, far from being a vital climate solution, nuclear power actually worsens climate change.

The International Energy Agency says in 2010–20, renewables cut global power-sector carbon emissions 5× more than nuclear growth did. Then renewable output tripled while nuclear flatlined. Arithmetic is not an opinion.

We must ask the right questions, though. We bought coal power by counting cost but not carbon. We're urged to buy nuclear power by counting carbon but not cost. But we must count carbon *and* cost *and* speed—and they're all linked: no business case means no climate case.

You see, new nuclear electricity costs manyfold more than renewable electricity. But that means new nuclear makes *manyfold less electricity per dollar. It thus displaces less fossil fuel per dollar*. *



It also displaces less fossil fuel per *year*, because it takes about a decade longer to build. China is the world leader in building both nuclear and renewables, but they scale very differently. Last year, China raised its expected electricity generation 50× more by adding solar and wind than by adding nuclear. [Globally, that ratio was 28×.]

Even operating most *existing* nuclear plants isn't climate-effective, because it saves less carbon per dollar than renewables or efficiency.

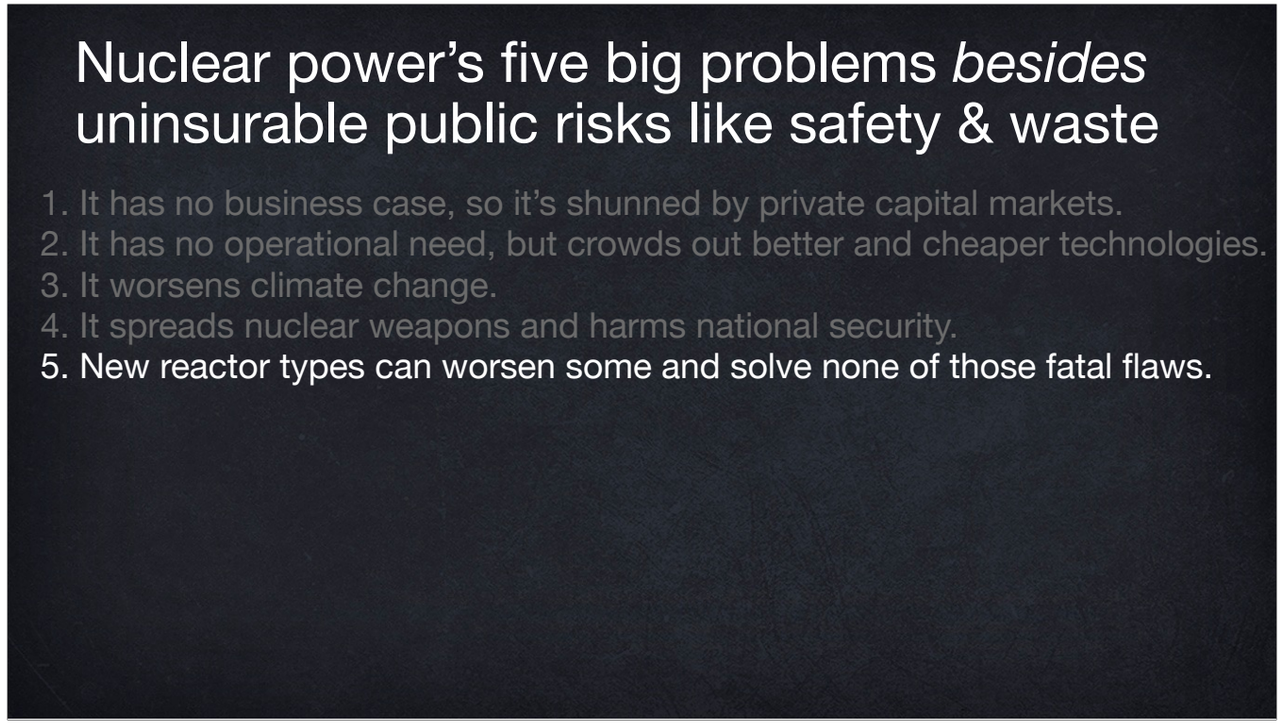
Climate urgency makes it vital to save the most carbon per dollar and per year. Nuclear does the opposite. The nuclear industry is very keen that you not understand this. *

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.

Fourth, nuclear power spreads nuclear weapons and harms national security. /

Despite international controls, nuclear power proliferates do-it-yourself bomb kits [of materials, skills, equipment, and technologies, all] wrapped in civilian disguise. But accepting nuclear power's commercial collapse would make those bomb ingredients no longer ordinary items of commerce. They'd be harder to get, more conspicuous to try to get, and politically costlier to be caught trying to get (or supply), because they'd be unmasked as military. This would make proliferation not impossible but far harder, and easier to detect timely. For less than a day's cost of the Iran war, giving Iran solar-and-battery power to replace its sole reactor would remove its excuse for wanting uranium enrichment. /
If a nation with the United States' wealth, skill, and fuels claims to "need" nuclear power, others less blessed can claim they need it too, so our example matters. We should make all options compete, unsentimentally choose the best buys, and freely help any other country achieve *both* of the Non-Proliferation Treaty's goals—nonproliferation *plus* secure and affordable energy for development. Next, link such leadership to mutual arms reduction and a psychological climate of denuclearization, and the US example could start to build hope of a safer world, for all, for ever. *



Fifth, "new" reactor types won't help. They're not new, and their differences of detail don't change the outcome. /

As you'll hear next, fashionably rebranded "Small Modular Reactors" ("SMRs") or "Advanced" reactors, * even if they existed commercially, couldn't fix these fundamental problems. * SMRs' safety is often uncertain, their proliferation and waste challenges are broadly worse, and their * economics remain dismal. A smaller reactor *can* cost less, but its *output* shrinks even more, so SMRs save money only in the sense in which a smaller helping of foie gras helps you lose weight. /
Electricity from new small reactors would initially cost about twice as much as from big reactors. *Their* electricity now costs ~3–6× more than *renewable* electricity, whose cost will soon fall by another twofold. Do the math: 2 × (3 to 6) × 2 = 12 to 24. * Making small reactors 12 to 24× cheaper is a fantasy—just matching big reactors would be hard. * Before they could even do that, the US grid will be decarbonized anyway, with or without nuclear growth. /
* Small Modular Reactors are decades too late to catch up with mass-produced Small Modular Renewables. And * even if the nuclear part cost *nothing* to build, the non-nuclear part still couldn't compete with renewables—* nor with efficiency, which can save ~80% of the world's delivered energy even more cheaply. *

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.
5. New reactor types can worsen some and solve none of those fatal flaws.

A. "Small Modular Reactors" are not a commercial product anywhere

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.
5. New reactor types can worsen some and solve none of those fatal flaws.

A. "Small Modular Reactors" are not a commercial product anywhere
B. Safety often uncertain, wastes and proliferation generally worse

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.
5. New reactor types can worsen some and solve none of those fatal flaws.

A. "Small Modular Reactors" are not a commercial product anywhere
B. Safety often uncertain, wastes and proliferation generally worse
C. Must become ~12 to 24× cheaper to beat renewables—no way

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.
5. New reactor types can worsen some and solve none of those fatal flaws.

A. "Small Modular Reactors" are not a commercial product anywhere
B. Safety often uncertain, wastes and proliferation generally worse
C. Must become ~12 to 24× cheaper to beat renewables—no way
D. Far too late: very few SMRs are buildable before US grid is decarbonized

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.
5. New reactor types can worsen some and solve none of those fatal flaws.

A. "Small Modular Reactors" are not a commercial product anywhere
B. Safety often uncertain, wastes and proliferation generally worse
C. Must become ~12 to 24× cheaper to beat renewables—no way
D. Far too late: very few SMRs are buildable before US grid is decarbonized
E. Small Modular *Renewables* are already hundreds of times faster

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.
5. New reactor types can worsen some and solve none of those fatal flaws.

A. "Small Modular Reactors" are not a commercial product anywhere
B. Safety often uncertain, wastes and proliferation generally worse
C. Must become ~12 to 24× cheaper to beat renewables—no way
D. Far too late: very few SMRs are buildable before US grid is decarbonized
E. Small Modular *Renewables* are already hundreds of times faster
F. "Small Modular Reactors" can't compete even if the nuclear part is *free*

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.
5. New reactor types can worsen some and solve none of those fatal flaws.

A. "Small Modular Reactors" are not a commercial product anywhere
B. Safety often uncertain, wastes and proliferation generally worse
C. Must become ~12 to 24× cheaper to beat renewables—no way
D. Far too late: very few SMRs are buildable before US grid is decarbonized
E. Small Modular *Renewables* are already hundreds of times faster
F. "Small Modular Reactors" can't compete even if the nuclear part is *free*
G. Using energy 5× more efficiently is even cheaper

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.
5. New reactor types can worsen some and solve none of those fatal flaws.

A. "Small Modular Reactors" are not a commercial product anywhere
B. Safety often uncertain, wastes and proliferation generally worse
C. Must become ~12 to 24× cheaper to beat renewables—no way
D. Far too late: very few SMRs are buildable before US grid is decarbonized
E. Small Modular *Renewables* are already hundreds of times faster
F. "Small Modular Reactors" can't compete even if the nuclear part is *free*
G. Using energy 5× more efficiently is even cheaper

Nuclear power's five big problems *besides* uninsurable public risks like safety & waste

1. It has no business case, so it's shunned by private capital markets.
2. It has no operational need, but crowds out better and cheaper technologies.
3. It worsens climate change.
4. It spreads nuclear weapons and harms national security.
5. New reactor types can worsen some and solve none of those fatal flaws.

Why pay—let alone extra—for a risky non-solution?

With these five well-documented attributes, nuclear power isn't worth paying for—let alone extra. We'll get no more reactors than taxpayers can be forced to pay for, under the full nuclear socialism now proposed by conservatives who know governments are really great at building and running stuff.

Many in Washington mouth the mushy mantra that climate urgency demands "all of the above." But the more urgent climate change is, the more we must invest judiciously, not indiscriminately, to buy cheap, fast, sure options instead of costly, slow, speculative ones. Only this strategy—the one utilities and capital markets are actually choosing—saves the most carbon per dollar and per year. Anything else worsens climate change.

So the next time you hear some official say we support "all of the above—we're not picking and backing winners," remember how the dean of US utility regulators, Peter Bradford, replied: "No, we're not picking and backing winners. They don't need it. We're picking and backing losers."

Please be sure *you* don't do that. Thank you.