

[FORTUNE MAGAZINE APRIL 27, 2021](#)

Nuclear drawdown: How two little-known private companies are taking over the biggest environmental cleanup in U.S. history

The pair are seeking to tap into tens of billions in funding. But are they up to the job?

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April 27, 2021 5:30 AM CDT



Workers off-loading a rail transportation cask containing nuclear waste from the Vermont Yankee Nuclear Power Station, which is being decommissioned by NorthStar. COURTESY OF WCS

To tourists and locals alike, the Indian Point nuclear power plant is an industrial blight on New York's scenic Hudson Valley. Located 40 miles north of Manhattan, it's a mysterious-looking facility of silos and flat, lifeless buildings that can induce shudders of radioactive fear. To [Entergy](#), the power company that operates the plant, Indian Point has become a burden—a money-losing, polluted site that is worth more to shutter than keep open. Cleaning up the site would take decades and cost untold billions of dollars.

But Entergy has found a nifty solution to its costly problem. In April 2019, the utility said

it would sell the Indian Point plant to [Holtec International](#), a relatively small company based in Camden, N.J. The transfer, to be finalized this spring, would dissolve Entergy's responsibility for the plant and turn over the job of closing and decontaminating Indian Point to Holtec, which has never before decommissioned a nuclear facility. Despite its lack of experience in such challenging and sensitive work, Holtec appears confident that it can decommission Indian Point decades earlier than planned and shave millions off the estimated cleanup costs in the process. That would allow it to pocket as profit the remaining money Entergy set aside to raze the plant.

This type of arrangement is new. But in the next few years, it will become commonplace. America's nuclear power industry is in the process of dying, especially in states with deregulated electricity markets. The utilities and government agencies charged with overseeing the safe operation of the nuclear plants for decades are preparing to move on—and a pair of unproven players are stepping in with a bold plan to capitalize on the transition.

Simply put, the dismantling of the U.S. nuclear power industry, by any measure the largest environmental cleanup in American history, is being handed off to two private companies with low public profiles and histories of bribery or financial failure—Holtec and its New York-based rival [NorthStar Group Services](#). These companies are drawn to the business by an enormous prize: tens of billions of dollars in cleanup trust funds held by the utilities and collected from customers over decades.

The [Nuclear Regulatory Commission](#), which oversees nuclear plant operations, has given the green light to these new arrangements despite serious questions raised about the ability of these companies to live up to their promises. The agency is also getting ready to okay Holtec's and NorthStar's audacious plans to develop two temporary waste dumps for spent reactor fuel. By enabling the combined storage of up to 170,000 metric tons of radioactive waste near poor communities in New Mexico and Texas, the sites may generate significant revenue for the two companies. The arrangement, say industry observers, comes after 60 years of dysfunction by Congress and the Department of Energy in attempting to build a safe, permanent repository for nuclear waste.



Indian Point Energy Center in Buchanan, N.Y., seen here in April 2020.

JOHN MEORE & PETER CARR—THE JOURNAL NEWS USA TODAY NETWORK/
REUTERS

As federal regulators sign off, a chorus of attorneys general and nuclear industry experts is warning that the decommissioning companies have seriously underestimated costs and dangers, are ill-equipped to handle the jobs safely, and have troubling track records that bear closer examination before Holtec and NorthStar are given free rein on such sensitive projects. They worry the companies will bleed the cleanup trust funds dry, go bankrupt, and leave behind unfinished teardowns, dangerous radioactive pollution, and billions of dollars in extra cleanup costs.

“If the money runs out, what do you do?” says Greg Jaczko, who led the NRC from 2009 through 2012. “Do they just walk away from the project, declare bankruptcy, and it becomes a new cost to taxpayers?”

The U.S. nuclear energy era that began in the 1960s is ending. Currently, in the U.S., there are 94 power reactors at 56 sites, the world’s oldest fleet. Six sites have closed recently, including well-known power stations such as Three Mile Island in Pennsylvania and Pilgrim near Boston. Indian Point will cease operating this month and utilities have already announced the closure of eight more reactors by 2025.

Today’s nuclear plant decommissioning wave was set in motion in the 1990s, as electricity deregulation took hold in parts of the country. Forced to compete against coal and natural-gas plants that were cheaper to maintain, nuclear sites became unprofitable albatrosses to utilities like Con Edison, which built Indian Point and began running it in 1962. As nuclear plants became less profitable to operate, they became more valuable to own. That’s because after the infamous Three Mile Island accident in 1978, the NRC

required utilities to put a portion of ratepayers' bills into trust funds dedicated to cleaning up nuclear plants. Nationally, those trust funds are now worth a total of some \$68 billion. Which sparked an idea. Scott State, a nuclear engineer who is the CEO of NorthStar, developed a plan in the late 1990s very much like the one in place today; that is, take ownership of the unprofitable plants and use the trust funds to do the cleanup with profit margins built in. State pitched his proposal to power companies back then but was rebuffed.

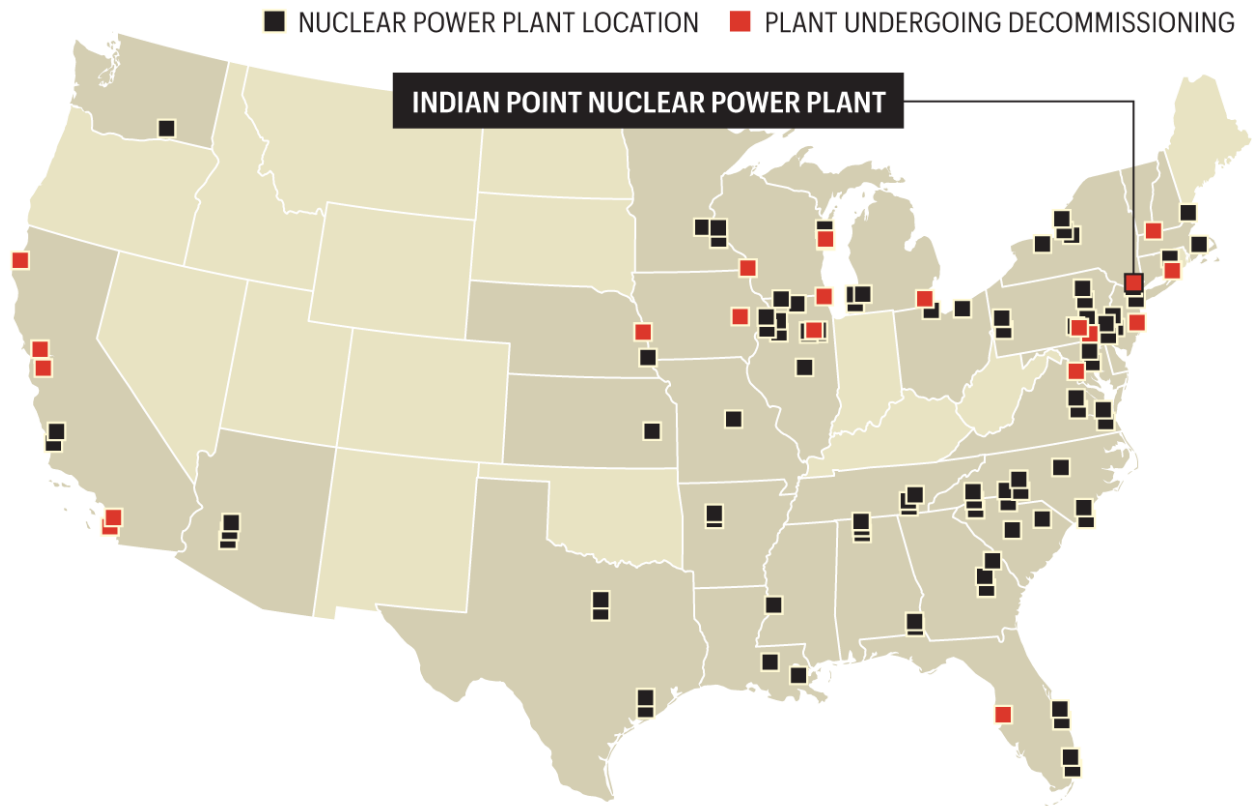
Enter Entergy. With a portfolio of nuclear, fossil fuel, and hydroelectric power sites in regulated states, Entergy felt it could make money in deregulated markets, so long as it acquired nuclear plants at relatively low prices. So Entergy bought Indian Point, Vermont Yankee, Pilgrim, and Palisades in Michigan—in the case of Vermont Yankee paying about one-quarter the cost of building a new nuclear plant.

The plan didn't work out. Nuclear plants cost more to maintain as they age, so operating budgets increased and squeezed margins. Meanwhile, cheap natural gas and the emergence of renewable energy sources caused energy prices to plummet. By 2015, Entergy was negotiating with NorthStar to off-load Vermont Yankee. Then Holtec followed NorthStar's lead, snapping up Pilgrim and Indian Point.

This seemed like a promising development. Before these deals, the utilities were going to close the plants anyway and let reactors sit idle for 60 years, waiting for the trust funds to grow in value. Then they would begin the actual cleanup. Holtec and NorthStar claim they can finish the job and return the land to productive use in just 12 years.

But as they got a closer look at Holtec and NorthStar, state officials and some nuclear experts became less sanguine about these new arrangements. "Putting the decommissioning of a nuclear plant in the hands of a company with no experience and uncertain financial resources is very risky," said Letitia James, New York's attorney general, [in a statement last year](#) announcing her opposition to the plan. James is now suing the NRC to stop Holtec's Indian Point takeover.

NUCLEAR POWER PLANTS IN THE U.S.



SOURCE: U.S. NUCLEAR REGULATORY COMMISSION

Among the specific concerns shared by James and other critics of the plan is whether the money allocated for decommissioning is adequate. Holtec, whose primary business is making storage casks for nuclear waste, says that the \$2.3 billion Indian Point trust fund is ample to do the job. But that claim is based in part on NRC's formula for decommissioning costs, which dates to the 1970s. Beginning in 1993, a series of [GAO](#) and internal NRC studies warned that the agency's calculations underestimate the true cleanup costs by up to 25%. Still, the NRC has failed to fix the formula. Faulty estimates have led to major cost overruns at most decommissioning projects attempted so far.

"Almost invariably in the work I've done, the costs were greater than expected," said Julia Moriarty, senior vice president of the Callan Institute, which advises nuclear trust fund managers.

Questions raised about trust fund deficits only amplify the skepticism toward Holtec's assurances that it can afford to complete a decommissioning project without asking authorities for more money—skepticism that is rooted in Holtec's pattern of being less than truthful or making questionable decisions at key moments in its 35-year history. In 2007, a Tennessee Valley Authority (TVA) official pleaded guilty to federal charges of accepting a bribe from Holtec over a contract to store spent nuclear fuel. The investigation uncovered a recorded phone call in which Holtec founder and CEO Krishna Singh colluded with the TVA official to lie, concocting a story that the \$55,000 bribe was actually for background checks. Holtec was fined \$2 million, and was temporarily barred from TVA work for 60 days, the harshest punishment for a contractor in the agency's 88-year history. While declining to comment specifically on the company's role in the incident, a spokesperson for Holtec says that the company has since taken on work for the TVA.

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LETITIA JAMES, ATTORNEY GENERAL OF NEW YORK

Then Singh got into trouble again. Planning a factory in Camden, Singh failed to mention the TVA bribery case when Holtec applied for and was granted a \$260 million tax break, the second largest in state history. [According to reports in the Philadelphia Inquirer](#), the FBI and the U.S. Attorney's Office in Philadelphia launched criminal investigations of the state's tax exemptions program in September 2019. Separately, New Jersey's attorney general filed a grand jury subpoena in May 2019, signaling he was pursuing a criminal investigation into the subsidy program. This corporate tax subsidy program was drafted in 2013 in part by Kevin Sheehan, an attorney who represented Holtec in its application for the tax exemption. It passed with support from New Jersey power broker George Norcross, a member of Holtec's board. Holtec asked for the tax exemption in 2014. Law enforcement authorities would not comment on the status of these investigations. However, the New Jersey Economic Development Authority, the agency that issued the Holtec tax exemption, has since suspended payments to Holtec. A spokesperson for Holtec said in an email that the company "will not comment on pending or theoretical matters."

In court, however, Holtec has gone on the offensive. Last March, [the company sued the New Jersey EDA](#), challenging the decision to withhold the tax subsidy payments and claiming that it left the company "financially wounded." The company said it had borrowed against the tax break, and without the exemption it may not be able to afford to repay the money. To Holtec's detractors, this is clear evidence that the company has limited financial resources and will not be able to complete the Indian Point job if, as many expect, it blows through the budget. Indeed, in all nuclear plant decommissions, Holtec and NorthStar design a web of limited partnerships to handle different facets of the teardowns. Both companies say they will backfill their LLCs with cash if necessary. Nuclear industry insiders and state regulators counter that the entire point of an LLC is to shield parent companies from responsibility.



Unpainted overpack nuclear waste transportation containers at Holtec International in Camden, N.J., in May 2019.

JOE LAMBERTI—COURIER POST/USA TODAY NETWORK

The use of LLCs “raises a significant risk that [these entities] could at some point have liabilities that outstrip their assets and could choose to file for bankruptcy before site decontamination and restoration are complete,” Massachusetts Attorney General Maura Healey said of Holtec’s plan to buy Pilgrim, in a petition to the NRC. “There is no guarantee that Massachusetts citizens will not become the payers of last resort.”

Holtec’s reputation took another hit in the eyes of skeptics when it announced in 2018 that its decommissioning partner at Indian Point and other plants would be SNC-Lavalin, a Canadian engineering company that pleaded guilty to bribery and corruption to win contracts in Libya. An SNC executive was sentenced to eight years in prison; the company was hit with \$211 million in fines; and the scandal endangered Canadian Prime Minister Justin Trudeau’s 2019 reelection campaign.

NorthStar’s track record is not checkered like Holtec’s. But its tangled recent history raises some of the same concerns. NorthStar was formed in 2014—just one year before pitching the Vermont Yankee deal—by the merger of two demolition and remediation companies with only limited involvement in the nuclear industry. Both companies were in the business of razing buildings, cleaning up the sites, and salvaging scrap metal for sale. Now the combined company would enter the business of nuclear decommissioning. Within a year, the merger was contested by the partners, each of whom accused the other of fraud.

In the wake of this squabbling, questions arose about NorthStar’s ability to handle the Vermont Yankee decommissioning. In 2017 the private equity firm J.F. Lehman & Co. bailed out NorthStar, acquiring it for pennies on the dollar and recapitalizing it. Headed by John Lehman, former secretary of the Navy under Ronald Reagan, the firm gave

NorthStar instant credibility and political clout as it entered the nuclear decommissioning industry.

Lehman also acquired Waste Control Specialists (WCS), which owns a low-level nuclear waste disposal site in western Texas to which NorthStar plans to send Vermont Yankee's spent fuel. WCS was similarly reeling from a failed merger and had warned the NRC that it could face severe financial hardship without an infusion of cash.



NorthStar CEO State—who also serves as the CEO of WCS, a sister company in the Lehman portfolio—denies his company was ever in financial straits. But his negotiation to buy Vermont Yankee stalled over concerns about cash flow. NorthStar insisted the plant's \$525 million trust fund was adequate for the cleanup; Vermont officials estimated cost overruns could double that total. The deal was approved only after NorthStar and Entergy caved, committing \$340 million in additional cash and insurance. That may still not be enough, though. "Even as of June 2017 [post-recapitalization], NorthStar was highly leveraged and did not appear to have sufficient funds available to satisfy the initial agreement," says Daniel Dane, a consultant with Concentric Energy Advisors, who was hired by Vermont officials to review the deal.

In response to questions from *Fortune*, Holtec, NorthStar, and Entergy said that the NRC and other agencies have reviewed the financial health and technical capabilities of Holtec and NorthStar and have given the companies the go-ahead to take on the decommissioning efforts. A spokesperson for Entergy asserted to *Fortune* that Holtec is a "global leader in the safe management and storage of used nuclear fuel." Holtec added, in a statement to *Fortune*, that "in the unlikely event that a funding shortfall is projected, [the company] would have to present to the NRC acceptable alternatives or additional funding assurance for decommissioning." In the statement, Holtec also promises that "residents, ratepayers and government bodies would not be responsible for any overruns." Meanwhile, a spokesperson for NorthStar noted that, two years in, the Vermont Yankee project is on schedule and on budget.

The financial wherewithal of Holtec and NorthStar tends to dominate discussions about plant decommissioning, but another critical issue, safety, is increasingly raised, generally focused on Holtec. Two recent incidents at the San Onofre nuclear plant near San Diego stand out. In August 2018, a cask manufactured by Holtec containing spent nuclear fuel got stuck on the lip of a silo as workers lowered it into the ground. Had it slipped, the canister would have plunged 18 feet and likely released radiation. After an investigation, the NRC labeled the accident a “near miss.” Holtec’s own inquiry found that in managing the process of depositing the cask, the company had failed to implement “the necessary level of oversight commensurate with the complexity and risks” and that its communications with workers and training programs were inadequate.

The second incident occurred that same summer when regulators learned that Holtec changed the design of its casks without telling the NRC. The agency called this “potentially safety significant.” Holtec was forced to abandon the new design.

Singh [admitted in testimony before the NRC](#) that it was implemented out of “technological greed” because the unlicensed changes were easier to fabricate. He added: “We did not foresee the problem—I readily admit to you, we did not see our limitation. This was definitely an eye-opener for us; we have learned how to treat manufacturing evolutions more respectfully.”

As Holtec and NorthStar compete for market share in nuclear decommissioning, they face an old, unresolved problem: Where to put the radioactive waste. NorthStar and Holtec have big plans to dump the spent fuel casks in the rural Southwest. NorthStar’s sister company Waste Control Specialists wants to store 40,000 metric tons of high-level waste on a parking lot at its existing low-level dump on 14,000 acres in Andrews County, Texas. Forty miles away in Lea County, N.M., Holtec has the option to buy 1,040 acres of salty scrubland, where it hopes to drop fuel canisters into silos in the ground. The company envisions enough silos to hold all the fuel ever burned by commercial power reactors in the United States.

Both dumps would sit atop a branch of the Ogallala Aquifer, among the largest freshwater reserves on earth. Below that lies the rich oilfields of the Permian Basin. Natural-gas wells—some active, others abandoned, their locations unknown—encircle both sites. Some of the wells operate by forcing toxic water into the rock, causing the ground to tremble and sink. In the worst possible case, years of earthquakes could cause incremental small cracks in the spent fuel canisters, ultimately sending radioactive waste into the aquifer.



Looking north at the proposed site of Holtec's interim storage facility in New Mexico.
MINESH BACRANIA

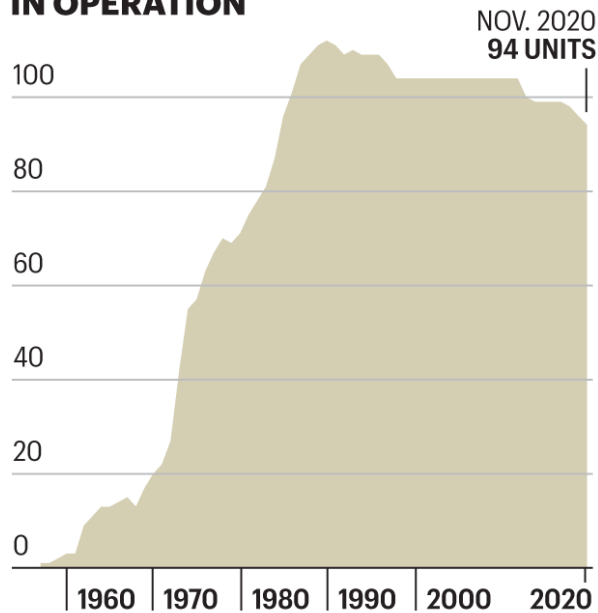
“It is the internationally agreed opinion” that spent nuclear fuel never should be stored atop oil and gas fields, says Ferenc Takats, who advises the International Atomic Energy Agency on nuclear waste and visited the New Mexico and Texas sites. “In a big country like the United States, I’m sure it would be possible to find a better site than these.”

The NRC has dismissed concerns from experts about radioactive waste harming local water reserves, oil and gas wells, endangered species, and quality of life in the area, and its staff has recommended that the agency approve both proposals. The agency defends its decision by pointing to voluminous Environmental Impact Statements containing numerous studies that the NRC says support the conclusion that these waste sites would not be unduly deleterious to the environment.

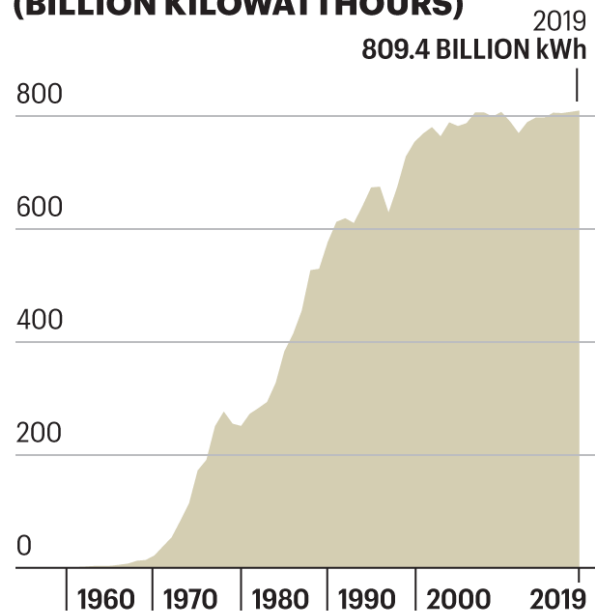
In an email, NRC spokesman Neil Sheehan told *Fortune*: “The big picture as of now is that the staff has not found any impediments to the repositories moving forward.” In addition, the agency maintains that the facilities are legal because, according to Sheehan, “both applications clearly identify the proposal as interim.”

To people versed in the history of nuclear energy, this is déjà vu. As early as the 1950s, regulators sought a permanent place to hold waste from reactors. One of the first ideas was to convert an abandoned salt mine in Lyons, Kans. But that sparked furious local opposition, and in 1972 the government backed down. That increased pressure on regulators to build an interim dump in Tennessee. But with no permanent location in sight, Tennessee politicians worried that this “temporary” site wouldn’t be temporary at all.

NUCLEAR GENERATING UNITS IN OPERATION



NUCLEAR POWER GENERATION (BILLION KILOWATTHOURS)



SOURCE: U.S. ENERGY INFORMATION ADMINISTRATION

“That will always be the problem with interim storage facilities,” Jaczko said. “If there is no permanent repository, then interim is not interim. It’s permanent.”

Congress attempted to resolve the impasse in 1982 with the Nuclear Waste Policy Act, which required that the Department of Energy start construction of a permanent repository before allowing any interim sites. Congress also promised power companies that the energy department would take ownership of spent fuel, and start moving it to a repository, by 1998.

Later amendments to the act designated Yucca Mountain in Nevada as the sole permanent waste facility for spent fuel. But Nevadans fought the plan, forcing DOE to miss its 1998 deadline. In 2010, Nevada native Harry Reid used his power as Senate majority leader to permanently stop plans for construction at Yucca Mountain.

The result was more chaos. When the government broke its promise to take ownership of spent waste, power companies sued for the costs of having to safeguard the radioactive fuel and won. Reimbursements have already cost taxpayers \$8 billion; the industry estimates total costs will reach \$50 billion. The Energy Department also is sitting on a Nuclear Waste Fund containing an additional \$43 billion. The fund was created to pay for a permanent repository, but it could be repurposed for interim storage without legislative authorization, according to the Congressional Research Office.

Meanwhile, 83,000 metric tons of high-level waste sits stranded beside America’s nuclear power plants, which create 2,000 additional tons every year. The waste at Indian Point resides in tall steel-and-concrete canisters on a bluff high above the Hudson River. But at plants like Oyster Creek in New Jersey the canisters are at sea level, vulnerable to rising seas from climate change.

“We in this country are not serious, either about the disposal or the storage,” said Don Hancock, a leader of the Southwest Research and Information Center, an environmental group. “This will affect thousands of generations. We shouldn’t just do something that will leave them a more serious problem.”

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DON HANCOCK, A LEADER OF THE SOUTHWEST RESEARCH AND INFORMATION CENTER

Even after the NRC issues the permits, both dumps may face insurmountable obstacles. For one thing, there is already growing opposition to the idea of thousands of shipments of dangerously radioactive spent fuel traversing some of the U.S.'s most densely populated cities by train. These critics claim that many of the nation's tracks are too weak to support the required special rail cars weighing 180 tons apiece and that any accident could be catastrophic. Supporters of the prospective waste sites counter that similar radioactive shipments have already occurred to refuel and remove spent rods from nuclear plants. Indeed, about 1,700 metric tons of spent nuclear fuel were transported in the United States between 1962 and 2016, but most of these shipments were over short distances. A few dozen of these shipments experienced some kind of accident or localized radiation leak, mostly decades ago, according to the Energy Department. None resulted in injury or death.

Beyond the argument over safety, opponents may have the upper hand politically in trying to halt these shipments, particularly since the waste would travel through as many as 300 of the nation's 435 congressional districts. And the idea of nuclear waste being transported across the country concerns constituents like Gene Harbaugh, a retired Presbyterian pastor in Carlsbad, N.M., whose house overlooks the train tracks Holtec would use to transport waste to its site. "Over the years I've seen half a dozen derailments," Harbaugh says. "Sometimes they're empty box cars that just tip over."

Both New Mexico Gov. Michelle Lujan Grisham, a liberal Democrat, and Texas Gov. Greg Abbott, a conservative Republican, [oppose](#) the [projects](#) as environmental threats that also endanger tax revenues from oil and gas drilling. Stephanie Garcia Richard, New Mexico's commissioner of public lands, argues that Holtec's dump could cause lasting damage to the surrounding land and communities, citing an application in which the company informed the NRC that its temporary site may operate for 120 years. Holtec also told the NRC that it already has secured claims to its New Mexico land. But Richard says that's not true, since her office owns all mineral rights in the area.



Kris Singh, right, president and CEO of Holtec at a 2015 news conference to discuss plans to build a temporary storage site in Southeastern New Mexico for spent nuclear fuel.

SUSAN MONTOYA BRYAN—AP PHOTO

Still, Holtec and NorthStar are determined to gain approval because for companies of their size, under \$1 billion in revenue each, there is a lot of cash awaiting them if they can become the nation's radioactive waste managers. Executives at the quasi-public LLC that is selling the land to Holtec have told *Fortune* that Holtec anticipates about \$100 million in annual revenue for Phase 1 of the waste project. Based on that projection, with all 20 phases completed, eventually Holtec could enjoy a revenue stream of as much as \$2 billion annually from the site.

But currently, under the 1982 law, the DOE probably can't take ownership of spent fuel or pay anyone else to manage it until the agency builds a permanent repository (although there is some disagreement about that among nuclear experts). NorthStar CEO State believes that obstacle can be overcome. "We wouldn't be investing money in it if we didn't think there was some potential return," says State. "You would have to make some arrangement with the Department of Energy as to what it would be worth to them to consolidate the spent fuel."

Virtually everyone involved agrees that this hodgepodge of lawsuits, toothless legislation, and federal inaction is an incoherent and inept way to handle the most dangerous material on the planet. One proposal making the rounds would be for the federal government to get out of the way and turn over the responsibility for nuclear spent fuel management to power plant operators, the way that other industries like health care and agriculture must manage their own wastes. This private sector approach, with the federal government serving as overseer to make sure that the public is protected, would lead to innovation in nuclear waste disposal and pre-disposal activities as it would create profit opportunities for power companies to engineer

cheaper, more efficient solutions, says Katie Tubb, who studies energy issues for the Heritage Foundation.

“The federal government gets to be a neutral referee and the companies do the heavy lifting of actually siting and building a waste repository,” Tubb says. “It’s a much more coherent system than we have now.”

Others propose a more active role for the NRC. For instance, Jaczko advocates that the agency should require all reactor owners to maintain cash reserves equal to 20% of the decommissioning trust funds. If Holtec and NorthStar couldn't meet that standard, it would force them to exit the industry. And instead of sanctioning temporary dumps, which will force companies and the government to spend billions of dollars to move dangerous waste twice, Jaczko suggests that the NRC compel companies taking on the cleanup to simply construct a permanent repository from the get-go and eliminate interim sites altogether.

Almost forgotten among all the noise and wonky policy arguments surrounding this issue are the communities that will bear the brunt of the radioactive waste sites. Some residents in these areas have called the attempt to build these facilities environmental racism—moving dangerous spent fuel from relatively affluent communities on the coasts and in the Midwest, which benefited from nuclear power but don't want the waste, to small, majority-Latino counties, where the per capita income is half the overall rate in the U.S.

One lifelong resident, Rose Gardner, who lives within five miles of the NorthStar dump, recalls that when she was a girl, her street was paved in dirt, the night sky was black, and the earth lay still. Six decades later her street is asphalt, and the sky glows white from lights at the low-level waste site. If NorthStar wins permission to bring trainloads of spent reactor fuel into her town, Gardner has asked her two daughters to move away, also separating her from three grandchildren.

“Hopefully they can get out of this town,” says Gardner. “If this project comes through, this won't be a safe place to live. Does that seem fair? I don't think that's fair.”

Meanwhile, in Buchanan, N.Y., Indian Point's home, the plant is a big part of the daily discussion. Most residents and local officials are rooting for Holtec. Many don't know about any of the company's shortcomings, while others don't care. They are more worried about the tax revenue hit that their community will take—and how to refill the coffers—than about whether Holtec can handle the project. In fact, they're really focused solely on one outcome: removing any reminders of Indian Point and its voluminous waste, and quickly.