POLICY TIP SHEET

A Blueprint for State-Level Resistance to Industrial Solar

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THE PROBLEMS

- Industrial solar projects consume vast tracts of land, with most development occurring on productive farmland.
- Solar development causes significant environmental degradation, including the destruction of wildlife habitat, loss of biodiversity, and the generation of hazardous toxic waste with limited recycling or decommissioning oversight.
- The industrial solar supply chain is linked to slave and child labor, with key materials sourced from regions like Xinjiang, China, the Democratic Republic of the Congo, and Madagascar under unethical and dangerous conditions.
- Solar's intermittent nature destabilizes the electric grid, necessitating costly redundancies, backup generation, and operational inefficiencies that strain system reliability and increase blackout risks.
- The public bears the economic burden of solar power, with high hidden costs, dependency on taxpayer-funded subsidies, and government policies that have created and perpetuated the solar industry.

THE SOLUTIONS

To combat the expansion of industrial solar, state policymakers can:

- Repeal state-level renewable portfolio standards (RPS) that mandate artificial market demand for solar energy and raise electricity costs for ratepayers.
- Eliminate all special state-based financial incentives for industrial solar, including grants, tax credits, rebates, and special loan programs.
- Tax farmland converted to industrial solar use at the industrial property tax rate and apply exit penalties where appropriate.
- Reform net-metering mandates by requiring compensation at the wholesale rate and ensuring solar users pay for their share of grid infrastructure costs.
- Enact anti-ESG legislation that prohibits ESG-based investment decisions in state pensions, contracts with energy-discriminating firms, and discrimination by financial institutions based on ESG factors.
- Ban the procurement and use of solar components sourced through slave or child labor, impose strict permitting and siting requirements, and mandate comprehensive decommissioning and disposal plans.

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A Blueprint for State-Level Resistence to Industrial Solar

Industrial solar development has grown substantially in recent years, driven by aggressive state and federal mandates, subsidies, and other incentives.[1] In 2024 alone, the U.S. solar industry installed nearly 50 gigawatts of new capacity—a 23 percent increase over 2023—with industrial solar accounting for more than 80 percent of that growth. Unlike residential solar, which is typically installed on rooftops for private consumption, industrial solar entails massive, ground-mounted installations designed to generate electricity for the grid. These projects are promoted by climate activists and policymakers as essential to combatting climate change. However, industrial solar imposes steep economic, environmental, and social costs that are often hidden or externalized, which far outweigh the supposed benefits associated with industrial solar.

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THE PROBLEMS

From problems including the destruction of farmland and natural habitat to electric grid destabilization and increased costs to consumers, the expansion of industrial solar power is far from impact-free.[2]

1 Land Use and Loss of Farmland

Industrial solar projects require massive tracts of land to operate. A conservative estimate places the amount of land needed at 10 acres per megawatt of electricity produced, but broader analyses that include mining, disposal, and transmission infrastructure suggest the true figure is closer to 43.5 acres per megawatt. This makes solar vastly more land-intensive than coal, natural gas, or nuclear, each of which requires just 12–13 acres per megawatt. According to the U.S. Department of Energy, achieving state and federal renewable goals would require 5.7 million acres by 2035 and 10 million acres by 2050—equivalent to half a percent of the entire contiguous United States.

Due to the scale of land needed, most industrial solar projects are sited on agricultural property. This is particularly attractive to landowners, as solar companies offer lease payments well above standard farming or grazing rates. The U.S. Department of

1 This *Policy Tip Sheet* draws entirely from a larger *Policy Study* by The Heartland Institute. For the full *Policy Study,* including comprehensive citations that are not included in this *Tip Sheet,* see: Jack McPherrin & H. Sterling Burnett, "How States Can Push Back Against the Destructive Expansion of Industrial Solar Power," The Heartland Institute, *Policy Study,* April 15, 2025, https://heartland.org/publications/how-states-can-push-back-against-the-destructive-expansion-of-industrial-solar-power/

2 More discussion of each of these five overarching problems can be found in the larger *Policy Study,* including direct citations.

Agriculture found that 70 percent of industrial solar development between 2009 and 2020 took place on cropland or rangeland, and the American Farmland Trust projects that 83 percent of new solar will likewise occupy agricultural areas. Nearly half will cover land classified as the most productive, versatile, and resilient for farming. Once transformed into a solar facility, this land is generally removed from food production for decades. Even though co-location with agriculture is possible in theory, it is exceedingly rare in practice. In Iowa, the state's largest solar plant occupies about 1,000 acres that once grew corn and soybeans—90 percent of which is now entirely solar-covered and agriculturally inactive.

2 Environmental Degradation and Toxic Waste

Contrary to the claims of its advocates, industrial solar development is profoundly harmful to the environment. Solar farms displace wildlife, fragment ecosystems, and reduce biodiversity by clearing forests, grasslands, and deserts. In temperate regions, this leads to erosion and runoff. In arid environments like the Mojave Desert, native plants and endangered species face displacement and extinction. The Ivanpah solar facility in California is a case in point. Built on 3,500 acres of desert, it killed or displaced thousands of desert tortoises and incinerated an estimated 6,000 birds annually. The project has underperformed and is now set to shut down 15 years early, but its environmental damage is permanent.

These effects are not isolated. A 2016 report from Argonne National Laboratory estimated that between 37,800 and 138,600 birds are killed by U.S. solar projects each year—a figure that is likely outdated and conservative given the pace of industry growth. Beyond habitat destruction and direct animal mortality, industrial solar creates immense quantities of toxic waste. Solar panels contain lead, cadmium, and other substances designated as hazardous by the EPA. Compared to nuclear energy, solar produces at least 300 times more waste per unit of energy. Most solar panels last only 25 to 30 years, and as early installations reach the end of their life, the world is facing a wave of solar waste. The

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International Renewable Energy Agency projects more than 78 million tons of waste by 2050. Because recycling is costly and inefficient, used panels are often dumped in developing nations, where they leach toxins into soil and water and pose long-term health risks.

3 Slave and Child Labor

Much of the industrial solar supply chain depends on forced labor. Nearly half the world's polysilicon—the foundational material for solar panels—is produced in Xinjiang, China. This region is home to widespread government-led forced labor, particularly targeting Uyghur Muslims and other ethnic minorities. Between 2010 and 2020, China's share of global polysilicon production rose from 26 percent to 82 percent. Today, it is nearly impossible to purchase solar panels that do not rely in some part on materials sourced from Xinjiang.

Other critical inputs, such as cobalt and mica, are mined through child labor in the Democratic Republic of the Congo (DRC) and Madagascar. In the DRC, children are forced to extract cobalt used in solar batteries under extremely hazardous conditions. In Madagascar, children as young as four mine mica—which insulates solar panels—without protective equipment. Many suffer from dust inhalation and some suffocate due to oxygen deprivation. Despite public awareness, major solar companies continue to rely on these tainted supply chains. For example, Hanwha Qcells—America's largest solar panel provider—sources polysilicon from Xinjiang and received $2 billion from the Biden administration to build a plant in Georgia, despite ties to sanctioned Chinese firms.

4 Grid Instability and Inefficiency

Solar energy is intermittent and unreliable. It only generates electricity when sunlight is available, and even then, output varies with cloud coverage and temperature. In fact, high heat can reduce solar performance by up to 25 percent. Overall, solar has a capacity factor of just 25 percent, compared to 49 percent for coal, 54 percent for natural gas, and 93 percent for nuclear. This means solar cannot supply consistent electricity and must be backed by dispatchable sources such as gas or coal.

This redundancy creates significant problems for grid operators, who must continuously balance supply and demand. Solar supply peaks at midday when demand is moderate, then plummets in the evening when electricity use rises—a mismatch known as the "duck curve." To compensate, utilities must ramp up conventional generators, which increases fuel use, maintenance costs, and transmission inefficiencies. Dispatchable plants are often kept on "spinning reserve," burning fuel while idle. These backup systems add cost and complexity, all passed on to ratepayers. As the U.S. retires hydrocarbon-based plants and electricity demand surges—particularly from data centers and AI infrastructure—blackout risks increase. The Department of Energy estimates data centers could consume up to 12 percent of U.S. electricity by 2028. The North American Electric Reliability Corporation now warns that more than half of North America may experience blackouts within the next decade.

5 Economic Burden and Public Cost

Though solar is often labeled "cheap," its true costs are obscured. Levelized cost of electricity (LCOE) estimates generally ignore the many indirect expenses solar imposes, such as grid stabilization, backup generation, transmission upgrades, and shorter operational lifespans. When these are factored in, solar is among the most expensive energy sources. A 2016 study by the Institute for Energy Research estimated a real LCOE for solar of $140.30 per MWh, compared to just $39.90 for existing coal plants, $34.40 for natural gas, and $29.19 for nuclear. A more recent peer-reviewed study placed solar's full system cost at $413 per MWh—far exceeding wind ($291), nuclear ($122), coal ($90), and natural gas ($40).

These inflated costs are sustained by taxpayers. For years, the federal government has given industrial solar providers investment tax credits, production tax credits, loan guarantees, and grants. Ivanpah alone received $1.6 billion in federal loan guarantees and a $535 million grant, on top of generous tax preferences. Many states add their own incentives: property tax exemptions, rebates, grants, and more. Texas alone has at least 67 state-level solar programs. This policy landscape effectively guarantees solar's expansion, regardless of efficiency, reliability, or environmental impact—shifting costs away from private developers and onto the public.

POLICY RECOMMENDATIONS

Though the rapid growth of industrial solar power in the United States has been driven in part by federal regulations and incentives, state-level policies often play an equal or even more critical role in sustaining and expanding the solar industry. State policymakers interested in leveling the energy playing field, curbing industrial solar development, or eradicating the solar industry from their state altogether have myriad options they can consider.[3]

1. Repeal Renewable Portfolio Standards (RPS)

State RPS mandates require utilities to purchase fixed percentages of electricity from renewable sources, including solar, regardless of cost or reliability. These mandates create artificial demand, raise electricity prices, and crowd out more efficient sources. As of 2023, 28 states and the District of Columbia enforce RPS mandates—17 of which aim for 100 percent renewable energy by 2050. Policymakers should repeal these mandates or allow them to expire.

3 More detailed discussion of these policy recommendations can be found in the previously cited *Policy Study,* including direct citations.

2. Eliminate State-Level Solar Incentives

States should end all special financial incentives for solar, including tax credits, property tax exemptions, grants, and loans. These policies distort the market and allow solar companies to profit regardless of performance. Eliminating such subsidies would allow the market to determine whether solar can compete on its own merits.

3. Tax Farmland Used for Solar at Industrial Rates

When agricultural land is leased for solar projects, it is effectively converted into industrial use and should be taxed accordingly. States should apply industrial property tax rates and exit penalties to ensure fairness and discourage solar development on prime farmland, thereby protecting food production.

4. Reform Net Metering

Net metering allows residential solar panel owners to sell electricity back to the grid at higher retail prices, with utilities passing the increased costs through to all ratepayers. This effectively forces non-solar customers—often lower-income households—to subsidize wealthier solar users. States should require solar owners to pay for the costs associated with the installation, maintenance, and regulation of their two-way systems, and transition to a system in which utility companies pay solar customers for their excess generation at the wholesale rate rather than the retail rate.

5. Enact Strong Anti-ESG Laws

ESG investing pressures utilities, banks, and governments into pursuing solar projects and abandoning hydrocarbon-based energy, often circumventing democratic processes and degrading individual rights. States should ban the use of subjective, ESG-based investment criteria by pension funds, prohibit contracts with firms that boycott traditional energy sources, and prevent financial discrimination based on ESG considerations.

6. Ban Solar Products Made with Slave or Child Labor

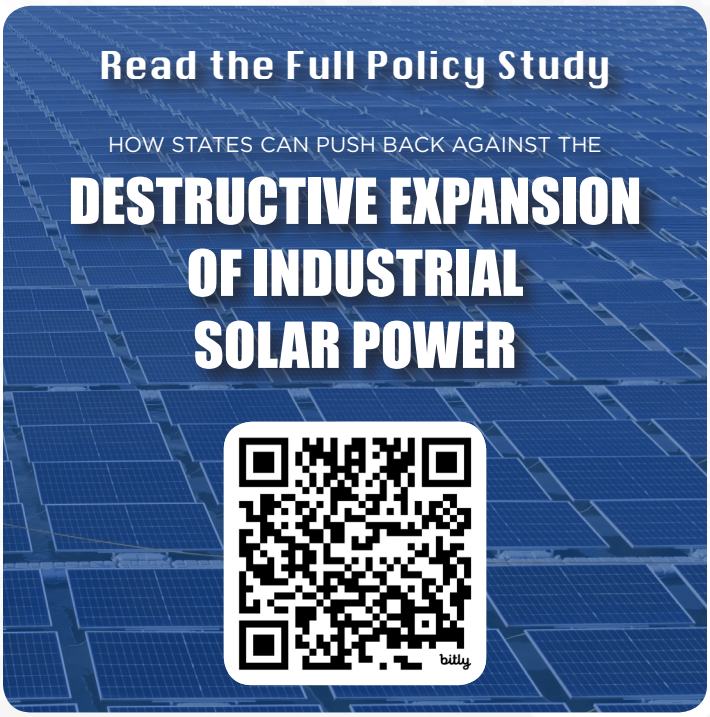
States can require certification that all energy sources—including solar—constructed or used in their state is free of forced and child labor. This would help ensure ethical sourcing and pressure solar companies to clean up their supply chains.

7. Impose Permitting and Siting Restrictions

States should eliminate preferential permitting for solar projects and require full environmental and community impact assessments. This levels the playing field and ensures that solar projects face the same scrutiny as any other energy source.

8. Require Decommissioning and Disposal Plans

Solar developers and owners should be held financially responsible for removing solar panels, restoring land, and disposing of hazardous waste. States can mandate decommissioning plans backed by bonds, letters of credit, or escrow accounts.



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